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STEEL

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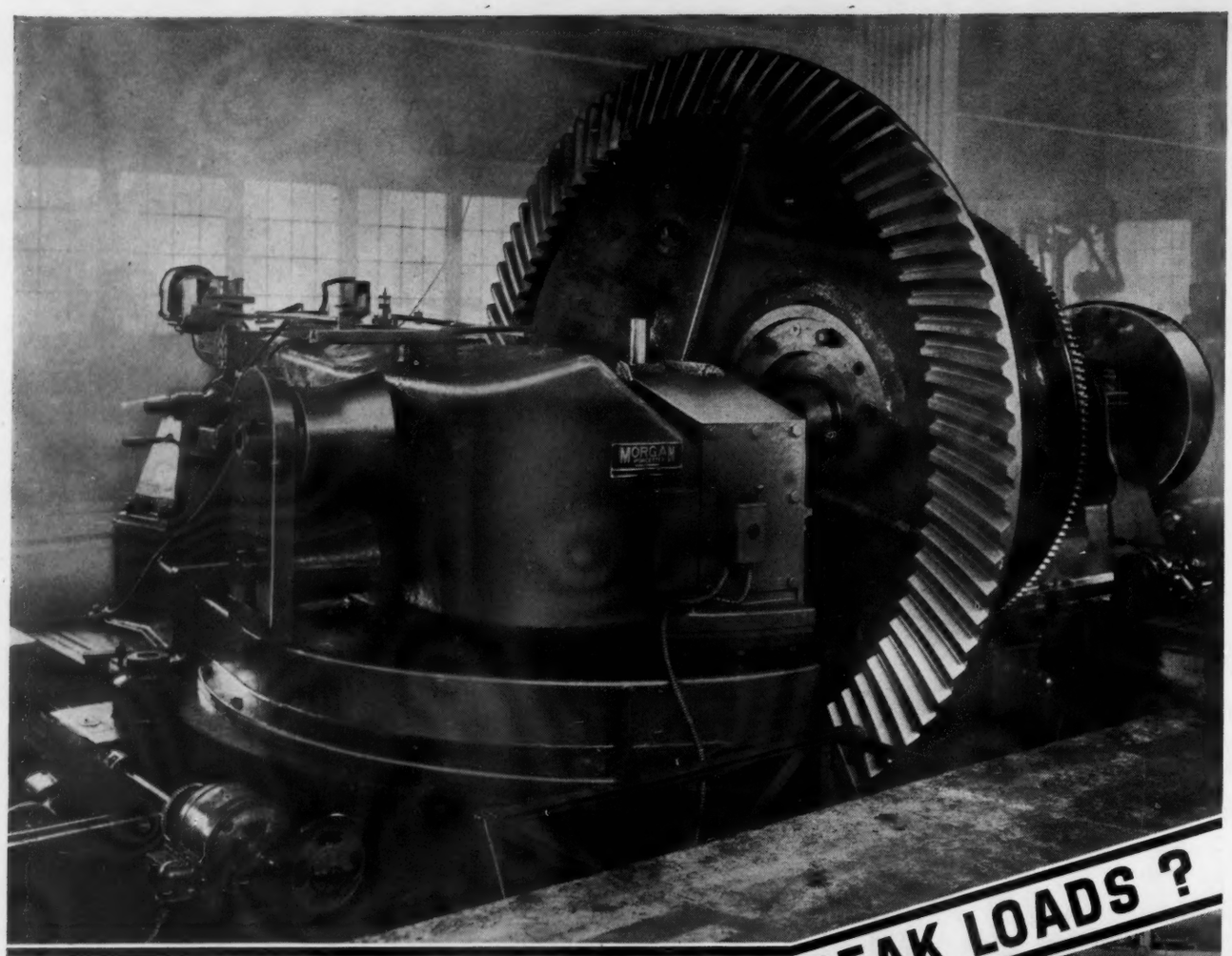
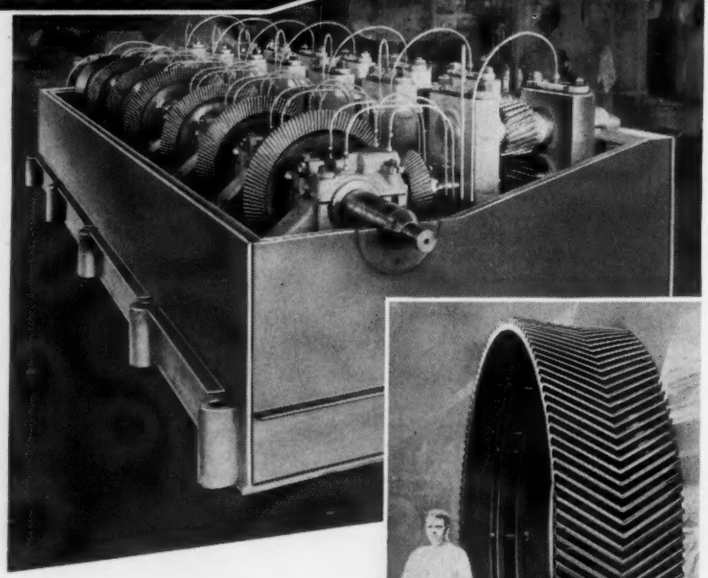
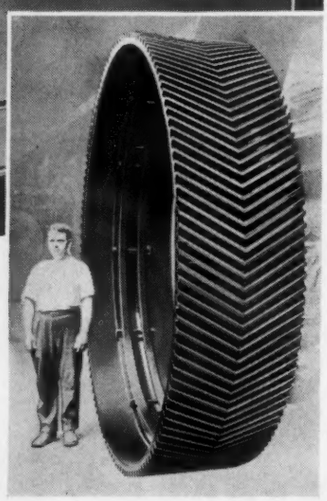


CAN YOUR DRIVES HANDLE PEAK LOADS ?





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LET MORGAN (WORCESTER ENGINEERS AND MANUFACTURERS) REMOVE THE LAGS

As the Editor Views the News

■ TREND in steelmaking continued upward last week when the rate of production (p. 21) moved up 4 points to 52 per cent of ingot capacity. Elation over this improvement is tempered by indications that consumption over the next 30 days (p. 81) will not match the steelmaking trend. Structural shape and concrete reinforcing bar awards are more active. Shipbuilding awards will attain a new peacetime record in 1939 (p. 22); at least 350,000 tons of steel will be consumed under this classification this year. Releases of tonnage against sheet and strip orders recently booked (p. 81) accounted for much of last week's rise in steel production. Holiday shutdowns and the Briggs strike (p. 29) bogged down automobile assemblies badly last week.

♦ ♦ ♦

Tax Change Uncertain

At Washington (p. 25) divergent viewpoints becloud the outlook for the new tax law and for neutrality legislation. Fate of contemplated Wagner act revision is in doubt. Last Thursday members of the commerce department's business advisory committee dined with the President; the subject (p. 26) was the country's economic condition and the problems of idle capital and unemployment. The President will hold further conferences of the same character with this or other business groups. . . . Pennsylvania (p. 26) has joined the ranks of the states outlawing certain objectionable tactics on the part of labor unions. . . . Research in steel technology formerly conducted by the Association of American Steel Manufacturers (p. 21) has been transferred to the American Iron and Steel institute.

♦ ♦ ♦

Give Facts To Workers

"Tell the workers that their real hope for prosperity lies in the revival of business," was the message sounded by Millard E. Tydings, United States senator from Maryland, at the forty-eighth general meeting of the American Iron and Steel institute. He urged that industrial leaders (p. 15) educate wage-earners to this fact. . . . This year's "triple mill supply" convention took the form (p. 19) of a cruise to Bermuda. Reciprocity was denounced by joint resolution. It will take the federal trade commission many years, it was predicted, to eliminate practices prohibited by the Robinson-Patman act. Despite fair trade laws, resale prices that have held strongly for 12 to 15 years have become demoralized during the past year on a number of lines.

♦ ♦ ♦

Sees Profit Mandatory

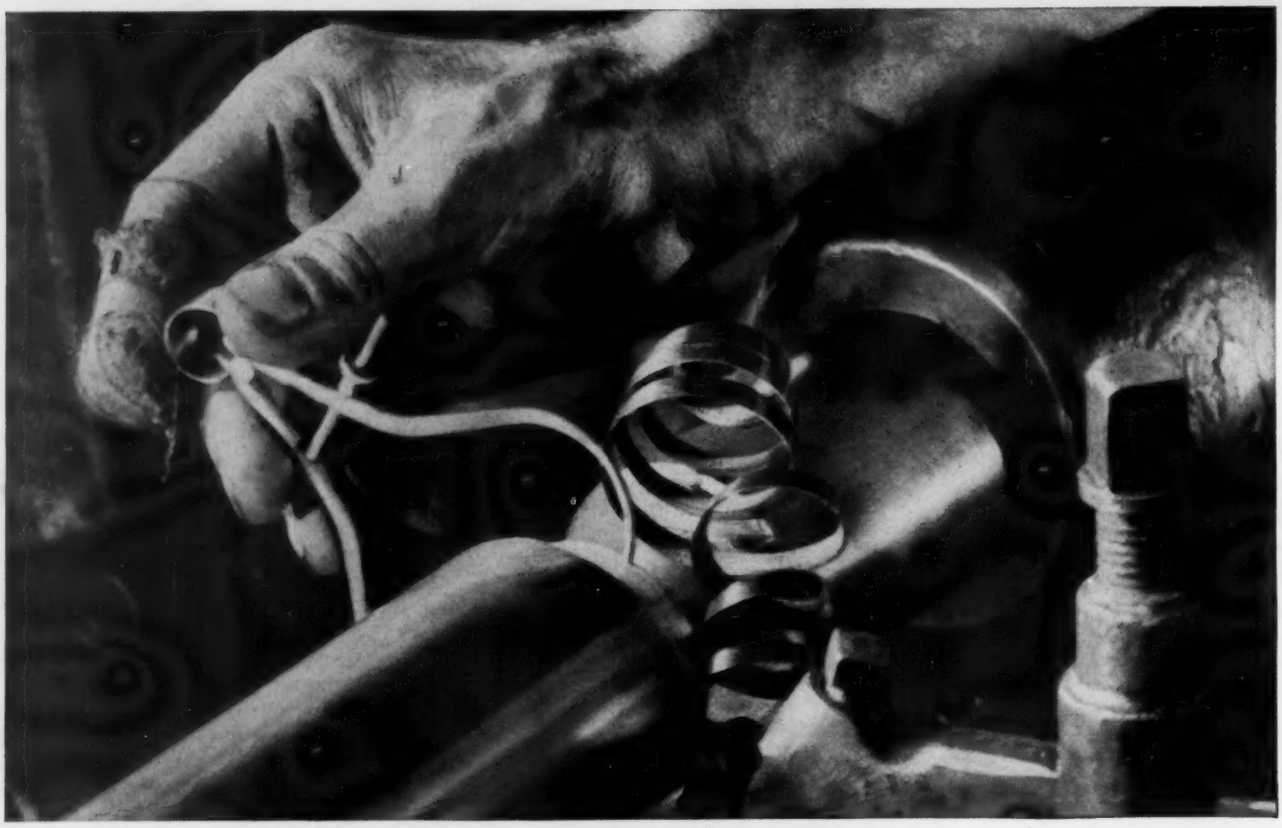
This week's contributor to STEEL's Forum on Re-employment (p. 38) came up through the shop. He is Walter B. Van Wart, executive vice president, Wyatt Metal & Boiler Works, Dallas, Texas, and he feels the American workingman is apt to forget that if the profit system were destroyed in this country his position would become far worse. There is great need, he feels, for education of public opinion so that federal and state governmental policies may be changed so as to bring lasting business recovery and re-employment. . . . A. J. Westphal, Atlas Steel Casting Co., Buffalo, outlines (p. 40) a policy of co-operation between buyer and seller of steel castings so that the former may derive full advantage of the numerous possibilities of steel castings.

♦ ♦ ♦

System Is Mechanized

A completely mechanized overhead handling system is one of the features of a plant laid out (p. 42) for high production manufacture and assembly of automobile lamp parts. . . . Many factors influence the coefficient of friction of a material. An engineer (p. 46) set forth test results that should guide design and application engineers in a sound interpretation of data. . . . Interesting use of high frequency induction furnaces (p. 49) is the heating of small motor laminations for melting thermoplastic cement while the laminations are under pressure. . . . Motion studies (p. 52) show how spray-guns can be used with less fatigue while at the same time increasing production and improving quality. . . . Good research results (p. 62) are obtained with an experimental open hearth furnace.

E C Kreutzberg



Certified Steels Help Lower Labor Costs

Labor costs, rapidly becoming today's No. 1 consideration, are in a measure dependent on materials. On most jobs where steel is used, shop costs are the largest and most variable single factor. While the cost of steel itself is relatively small, the quality plays a very important part in the control of these shop labor costs. If it is hard to fabricate—does not work uniformly—has hard spots to dull or break tools—or in the case of alloys, does not respond properly to heat treatment—then shop labor hours pile up and the job ticket shows red.

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"Tell Workers Real Hope for Prosperity Lies in Business Revival"

By MILLARD E. TYDINGS
United States Senator
from Maryland

■ IT IS a distinctive honor and a particular pleasure to be asked to address this distinguished gathering of Americans. Here are represented the leaders of one of the great industries of our country. In talking to you tonight, I shall make some comments upon the national scene, its recent past and its immediate future. Of course, the past is behind us. It cannot be changed. The future, on the other hand, is yet ahead and is ours to make what we will.

Out of the abundance of our great wealth and the accumulations from former periods of prosperity, it has been possible during the last seven years to experiment in the field of government in a most lavish fashion. If one experiment did not work well, it could be discarded and a new one attempted. Our resources were so great that at first the cumulative effect of experiments, both good and bad, did not deliver its full impact upon our economic life.

Demand Sound Remedies

However, even in a country with resources as great as ours, a decline in these resources and a tiring of the patience of the people with continuous government innovations in the end more than ever demand sound remedies.

We are now approaching that point in our national economy. At the beginning of the depression in 1929, our national debt was less than 20 billions of dollars. Today, it is 45 billions. How much is 45 billions of dollars? Well, if we were to begin paying off this debt at the rate of 500 million dollars a year, it would take five generations of American citizens to discharge it completely.

The interest charge on our national debt alone is now more than one billion dollars a year. If we were to begin at once a policy of paying current interest on the debt and decreasing that debt in principal 500 million dollars a year, it would consume 25 per cent of our present entire federal income for 90 years. The interest on the national debt takes 17 cents out of every dollar which the people pay in federal taxation.

It would take three generations, or 60 years, to bring down our national debt to where it was eight years ago, if it were reduced 500 million dollars a year.

Photo by Bachrach
Senator Tydings

This is the situation into which the brain-trusters, the rubber stamps, and the "Yes, Yes" boys have got the financial affairs of the United States government. The men who advocate spending oneself out of debt are the ones who advocate drinking oneself sober. In fact, these self-styled and pseudo liberals are the real reactionaries. They are the forces which are selling the American people into economic slavery.

Always they proclaim that next year, as a result of government spending, the income of the country is to be increased 20 to 30 per cent. In the meantime, while they spend, elect and experiment, the army of unemployed mills about the streets of our cities and towns as it has done for the past 10 years. In the meantime, agriculture has known few periods of even remote prosperity.

People Fear Consequences

The man on the side lines, who views it all, is driven to the belief that under the guise of improving the condition of the people, the government is actually squandering their substance and prolonging misery of the masses.

Obviously, this cannot go on interminably. To keep on, year after year, borrowing against the future, and chasing the mirage of prosperity in a desert of reckless and wasteful expenditure is to embrace real disaster eventually.

The whole reckless program is carried on in the same fashion that Mark Anthony employed with the Roman populace. You recall that Mark "came to bury Caesar, not to praise him."

Today, the same emotional build-up is used in this country to put over certain programs. As soon as common sense commences to dissipate the sophistry and lure of mere words, a new emotional build-

Address at the annual dinner, forty-eighth general meeting, American Iron and Steel institute, New York, May 25.

up, interlarded with name-calling and epithets, is begun.

Last Monday night I listened to the address of President Roosevelt before the Retailers National forum. In the course of his address, the President said (I quote): "It would be bad for business to shift any further burden to consumers' taxes. . . . Remember as business men and as retailers that any further tax on consumers, like a sales tax, means that the consumers can buy fewer goods at your store."

I agree thoroughly with the position taken by the President. It would be more interesting to have the President's comment upon the effect on consumers' purchasing power when the day comes—if it ever does—when the lavish expenditures which he has constantly advocated are to be paid for, as they will be, by the consumers of the nation.

Consumers Must Pay Debt

The President feels, he says, that a consumers' tax would be very bad for business. But the President did not say that eventually it will be the consumers of this nation who are going to pay off the tremendous debt which the present administration is foisting upon many generations to come.

If additional consumers' taxes would be injurious now, they will be injurious whenever they are laid, and they will have to be laid as I shall presently prove if the debt is not to be repudiated, directly or indirectly.

Now bear with me. Out of the $5,520,000,000 which the budget bureau estimates will be the total tax income for the United States in 1939, all of the corporations and all of the income tax payers of the nation will pay $2,086,000,000. How is the remaining $3,434,000,000 raised?

It is raised now, and always has been raised by taxes on the masses of the people, the consumers of the nation. And keep in mind that while the masses of the people—the consumers—are now paying over 60 per cent of our total national tax revenue, it is not enough to make income match outgo, for at the same time we are annually spending billions of dollars more than we are taking in.

It is, of course, true that when debt payment time comes that the corporations and the income tax payers alike are going to have to pay heavy additional taxes. But even if we take every cent of income from all of the people in this nation who receive more than $100,000 a year, it would only amount to $974,000,000. It is obvious that the well-to-do, if we took every cent they received, could not produce the money needed to meet our present expenses or to make up the sums needed for the eventual payment of the debt. The billions to be raised annually must come out of the sweat and toil of the working masses of this nation, the white collar worker, the farmer, the laborer and the skilled mechanic.

The President's logic that consumers' taxes hurt business is sound. If this is sound and true now, it will be equally sound and true when the consumers of the United States pay, as I have shown they must pay, the additional taxes necessary to liquidate the national debt.

Of course if the President is playing a hunch that prosperity, which has been continually promised each year for the last six years, really does come say after Jan. 20, 1941, then all may be well. But if the President's hunch should be wrong, what then? It is bad policy to run a government on hunches. It is bad to run it on money that five future generations will have to raise in order to make the nation solvent once more.

Obviously, the policies of the present administration cannot go on interminably. Indeed, to pursue the course much further is to hasten disaster. How, then, can we turn the flank of this movement, so shot with sophistry? That is the task of those who are in positions of leadership, in and outside of government, the task of getting the 120,000,000 men, women and children of this country back on the road of real recovery and improved conditions.

I shall attempt to prove tonight that there is only one way, in the main, in which this can be achieved, and that is by the revival of the private business of the nation.

All Industry Included

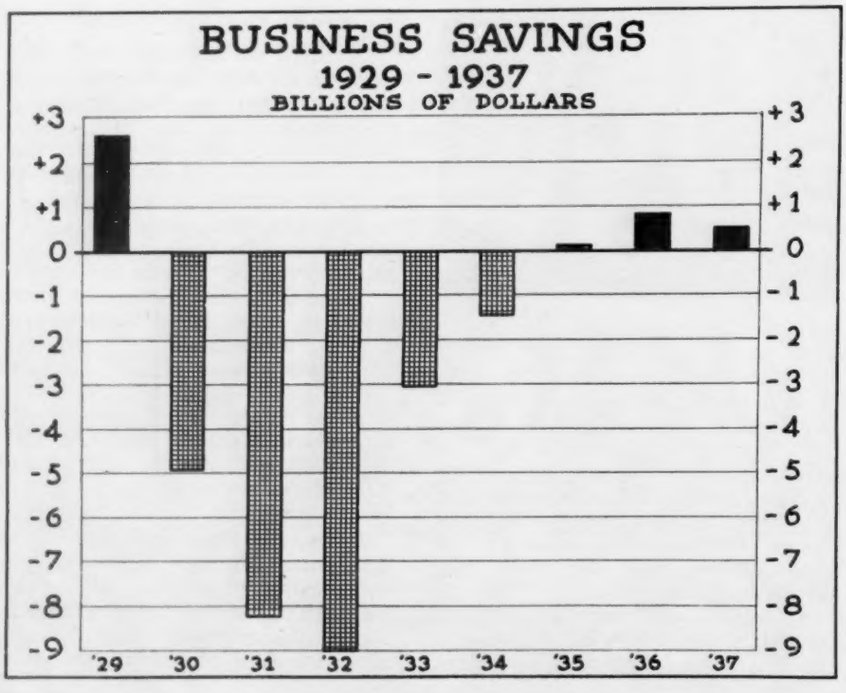
By business, I mean agriculture, mining, electric light, power and gas, manufacturing, construction, transportation, communication, trade, finance, services and miscellaneous enterprises.

In normal times, 50,000,000 persons find employment in one or the other of these activities. At present some 10 to 12 million of those normally employed are without work, or only partially employed.

How, then, can the machinery of business be started so that at least a large part of the army of the unemployed can be absorbed in everyday work, so that taxation and governmental expenditures can be decreased, and through the orderly exchange of goods and services, we can again know a normal life in this nation?

First, I am of the opinion that much of the half-baked legislation, some of which has been discarded such as the NRA and the AAA, the spend yourself out of debt and similar panaceas, has had its roots in a lack of comprehension of what the businesses that I have named really mean to the nation.

Our people have forgotten, it appears, that the only place in which a citizen can find work outside of government is in some line of business, whether it be manufacturing, transportation or agriculture; that government has nothing in the way of revenues except what it derives



Senator Tydings illustrated his address with nine charts, two of which are reproduced on these pages. The other seven were not available for reproduction when this issue of STEEL went to press.

from the conduct of private business; and that unless business can be resuscitated, unemployment, burdensome taxes, annual deficits and a disastrous national debt are inevitable.

In my judgment, the people of this nation, particularly the working people, do not appreciate fully how much they have at stake in the revival of business. Until they do, bad legislation, useless experimentation and innovation, and evil times, are likely to persist.

The charts which you see on the wall were prepared during the administration of Franklin D. Roosevelt. They are not my figures. They are the figures of the department of commerce of the United States government.

The first chart (see page 16) is entitled "Business Savings from 1929 to 1937," a nine-year period.

Outgo Tops Income

It deals with every business in the country, including agriculture. Look at the figures. In the year 1929, the business of the United States took in $2,583,000,000 more than it paid out.

In 1930, all the businesses of the nation paid out five billion dollars more than all the businesses of the nation took in.

In 1931, all the businesses paid out $8,052,000,000 more than they took in.

In 1932, all the businesses of the nation paid out $8,942,000,000 more than they took in.

In 1933, all the businesses of the nation paid out $3,094,000,000 more than they took in.

In 1934, all the businesses of the nation paid out $1,429,000,000 more than they took in.

And in 1935, for the first time in a five-year period, all the businesses of the nation took in $310,000,000 more than all the businesses of the nation paid out.

Lived on Resources

The startling summation shows that from Jan. 1, 1929, down to and including Dec. 31, 1935, all the businesses paid out $23,529,000,000 more than was taken in.

Business, during the years from 1930 to 1934 inclusive, was living upon the resources it had collected and set aside in good years. During this period of time, most of these resources were used up. While it is true that in 1936 and 1937 business as a whole was able to make a small profit, it was not sufficient to replenish the resources which business itself, not government, spent during the five deep years of the depression.

Business, during the seven years 1929-35 inclusive, has spent practically the same amount of money which the federal government has spent in an effort to overcome and survive the depression, for business has used up $23,529,000,000 of its accumulated resources in the period I have indicated.

Workers' Stake Largest

Without these resources, built up in good years, there would have been universal bankruptcy and economic chaos in this country. It was only because business had set something aside in the sunny days that it was able to carry on through the long storms and economic rain of the five years succeeding 1929.

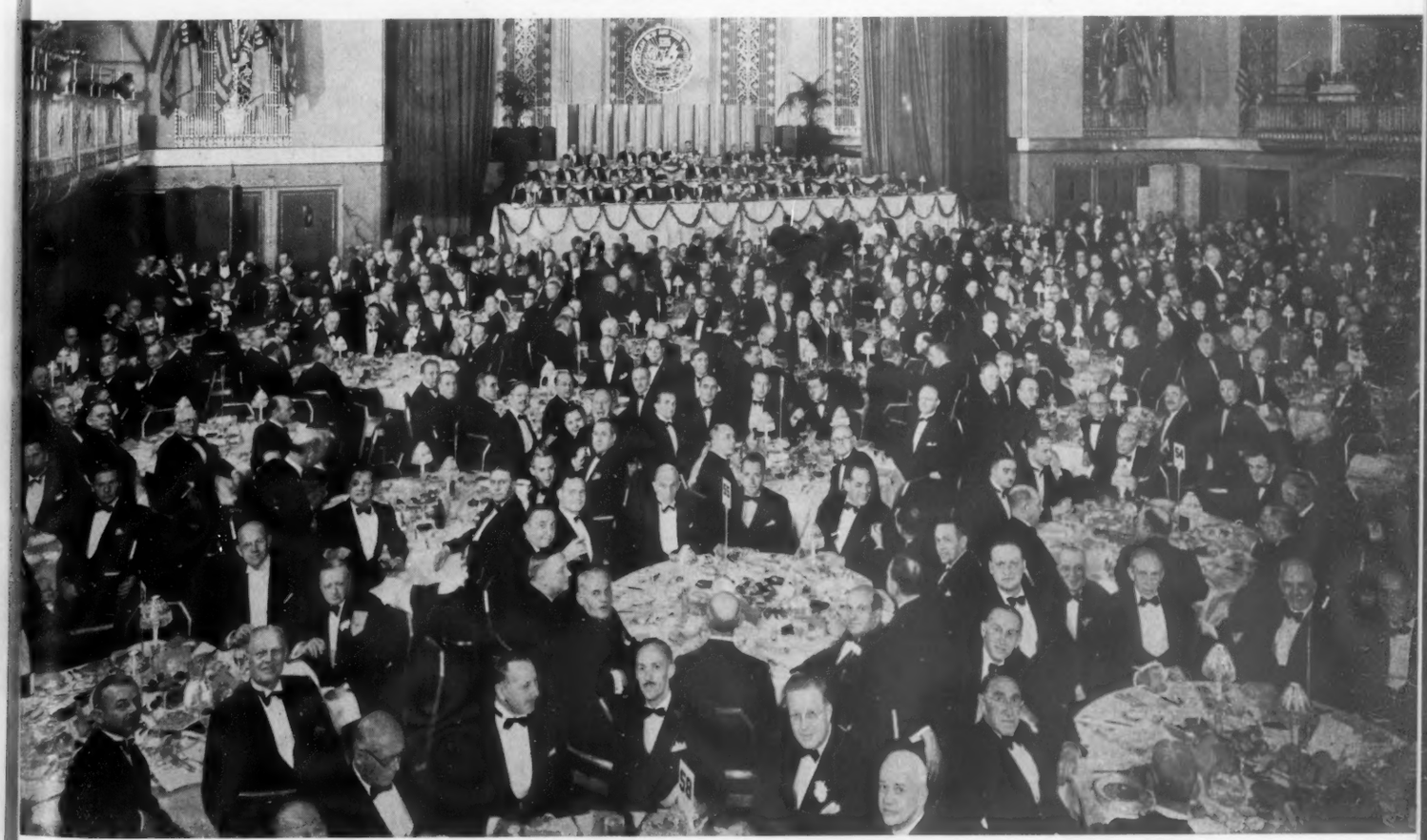
And yet, in the face of that contribution, high personages in government lose no opportunity to berate, belittle and attack, and sometimes to persecute men who have carried on through the depression at a greater loss of resources than the national government has experienced.

The man who preaches to the

Address Reprinted

Reprints of Senator Tydings' address before the forty-eighth annual meeting of the American Iron and Steel institute, reproduced on these pages, are available to STEEL'S readers at the following prices: Single copies or in small lots, 10 cents each; in lots of 100, 5 cents each

American Iron and Steel Institute Members at Annual Dinner



American people a general hatred of all businesses teaches them to hate the very source to which they must look for food, shelter and clothing for themselves and their families. No one has a bigger stake in the revival of business than have the 50,000,000 people who in normal times find employment in these various businesses.

Let me next refer you to the chart on manufacturing, embracing all the various activities of our people in the production of heavy and consumers goods — the steel, the automobile, clothing, furniture, typewriters, tools, bricks and the like. What do we find? We find that out of every income dollar which the great manufacturing interests of this nation have taken in, an average of more than 80 cents of that income dollar was paid to labor.

When a man buys an automobile from one of the large automobile manufacturing concerns, it never occurs to him that about 82 cents out of every dollar he paid for that automobile went for labor. He assumes that in the plant where the machine was fabricated, the component labor percentage was a good deal less than 82 per cent of the cost. He fails to realize that labor is a part of the cost of transporting and manufacturing the steel in the product; that labor is a part of the cost of taking the coal out of the ground, with which the plant is operated; that labor is a large part of the cost of growing the rubber, transporting it to this country and fabricating it into the tires with which the machine is equipped.

But a careful examination of all these facts, made under this very administration in Washington, shows that 82 cents out of the manufacturing income dollar goes to labor.

Let me next transfer your attention to transportation, under which are included the railroads, the bus companies, the boats and other agencies engaged in transporting cargo and persons. Out of every income dollar received by the combined transportation industries of this country, approximately 75 cents goes for wages.

Miners' Share 80 Cents

Let me next call your attention to the field of mining and quarrying, where the millions of miners in all branches of that activity are employed. Again we find that approximately 80 cents out of every mining income dollar goes to wages.

The cost of the materials and equipment used in the mines is made up largely of the cost of the labor necessary to gather, transport and fashion them into objects for use. This is part of the labor cost of operating the mines, as well as the payment of the labor which actually does the mining in the mines.

Now look at the great field of construction. Here again we find that approximately 80 cents out of every income dollar goes to pay labor.

Again, if we combine all of the industries of the nation together, including agriculture and forestry, in which the labor content is extremely low, we find that about 65 cents out of every income dollar from every source of work in the nation goes to pay labor (see below).

In sum, who has a larger stake in the revival of American business than do the millions of men and women employed in these activities?

My primary desire in wishing to revive the business of the nation is not so the well-to-do can make more money, but so the very poor may have an opportunity to work at fair wages and steady hours, so they may support themselves and their families according to the American standard of living. And where else in the United States can the unemployed find work at such a level of pay and steady employment except in a revival of business?

When I hear of sit-down strikes and efforts to array class against class, and hear business men denounced as a group, and see the chaos that everywhere is evident, I know these things would not be if those who are employed could be brought the knowledge that out of every income dollar which most businesses receive, approximately 80 cents goes to those employed in that business.

Too many people who are employed assume that labor is only a 10, 20 or 30 per cent charge against the income dollar of the business in which they are engaged and this lack of knowledge puts them in the frame of mind where they become the prey, the tools and the pawns of those who really exploit them in the name of progress.

Government Prepared Figures

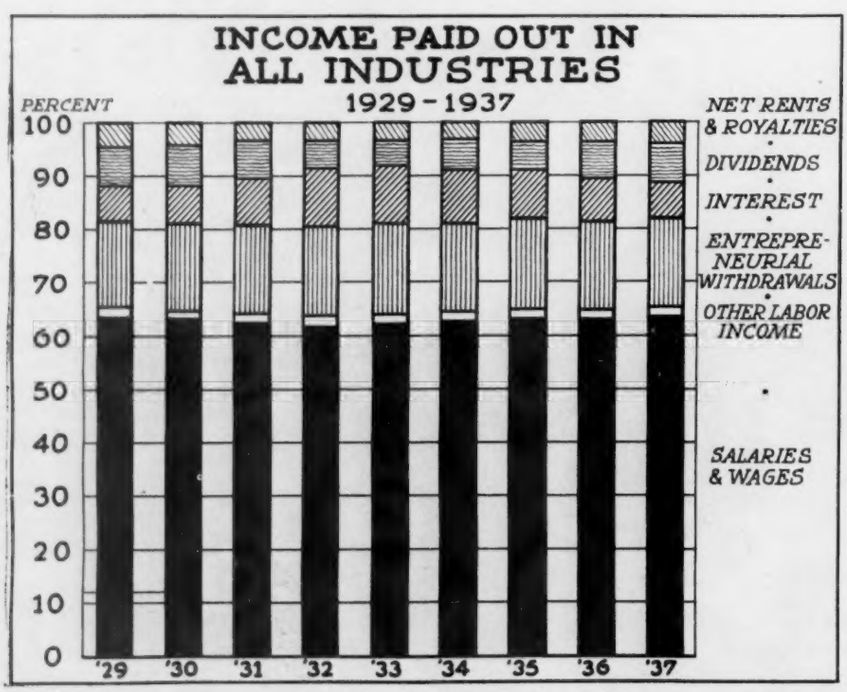
Again, let me remind you gentlemen that these charts and these figures were prepared in the department of commerce under the present national administration. They are in book form and can be obtained by any citizen upon requesting copy of booklets on "*National Income in the United States.*" There you will find these studies carried out in more detail than time will permit me to bring out here.

I would like to see these charts hung in every business house and plant of this nation, along with other charts showing that the masses of the people—the consumers—pay 60 per cent of the national taxes. That would lay the foundation for some good solid commonsense thinking. For the same working people who get the income from some line of business pay approximately three-fifths of all the tax money which the government of the United States collects.

They would then come to realize, first that in the revival of business there is employment for all; and, second, that in lavish governmental expenditures there are additional burdens for all to pay.

What I have heretofore presented

(*Please turn to Page* 79)



Reciprocity Is Denounced at Triple Mill Supply Convention

■ ON THE MONARCH OF BERMUDA, cruising to the "garden isle," representatives of mill supply houses and manufacturers held their thirty-fourth annual "triple" convention.

The groups included American Supply and Machinery Manufacturers' association, National Supply and Machinery Distributors' association, and Southern Supply and Machinery Distributors' association.

For the 534 passengers who sailed from New York May 25 and returned June 1 it meant more than a convention. It was a family outing, in which the vacation spirit predominated. Washington was not the theme; there was little reference to the general business outlook. Sessions were devoted mainly to problems of distribution. The supply houses want to know how their services may be made more valuable to buyers, to attract a larger share of that volume of business which now floats directly between consumers and manufacturers.

In opening the first general meeting, Friday, May 26, W. A. Purtell, Holo Krome Screw Corp., Hartford, Conn., president of the American association, commented on "the vastly improved relations" between manufacturers and distributors.

Cites Huge Potential Market

G. H. Halpin, general sales manager, Minnesota Mining & Mfg. Co., St. Paul, presented a paper in which he estimated the annual potential market for mill supplies as $2,750,000,000 to $3,500,000,000, or about 8 per cent of material costs in industrial manufacturing. Alvin M. Smith, Smith-Courtney Co., Richmond, Va., veteran secretary-treasurer of the Southern association, referred to this amount and portion as "peanuts," and urged the suppliers to do a more aggressive and effective selling job.

Hartley W. Barclay, editor, *Mill & Factory*, New York, read a paper "Your Business Potential in America's Rearmament Program," in which he estimated that of two billion dollars so far budgeted by the government the distributors' potential sales will be about 4½ per cent, or $90,000,000. He expressed the opinion that the great national defense program "may have turned the tide" in favor of new industrial plant construction.

The remainder of this meeting was devoted mainly to papers and comments on direct mail campaigns as an auxiliary in sales promotion.

In the afternoon the three associations held separate meetings.

In a brief review of "Developments in Washington," George A. Fernley, Philadelphia, advisory secretary to the National association, said:

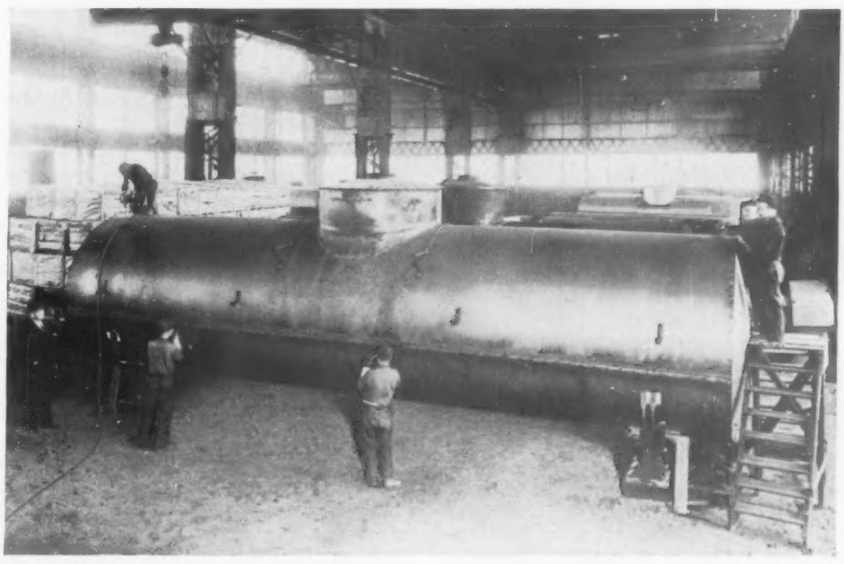
Defends Trade Commission

"It will take the federal trade commission many years to eliminate the practices prohibited by the Robinson-Patman act. We have heard considerable comment that the act has not been effective in preventing discrimination. To be fair to the commission, I think it has had a tremendous task, and has proceeded in a conservative manner. This has been due in part to a desire to establish sound legal precedent, and in part to the lack of trained personnel. Advices received recently indicate the commission feels the ground work has been laid, that some definite precedents have been established, and that it now intends to enforce the act more vigorously."

This meeting was given mainly to questions and answers, with many members offering suggestions and comment on such subjects as: What are the outstanding advantages of a bonus system (for salesmen)? Is it advisable to cost all invoices? What is more important, volume or profit?

The association took no action but referred to committee the question on which there was the most discussion and divergence of opinion, whether a manufacturer should name one "extreme" resale discount, leaving it to distributors to set up their own table of discounts,

Wide Sheets Cut Labor Costs



■ Direct labor costs are reduced 11½ per cent in a new type of tank car construction executed by General American Transportation Corp., Sharon, Pa. Feature is the use of wide sheets ranging in size from 50½ to 88½ inches. With the width of each sheet running longitudinally, welding footage is considerably less than for ring type construction. Photo, Republic Steel Corp.

or if the manufacturer should specify quantity discounts. Simplification of discount tables was urged by some speakers.

In a report to the Southern association, Mr. Smith stated:

"The question of reciprocal buying still is before us . . . It has reached the stage where it is a source of much worry and vexation to manufacturers who are being importuned by distributors to give them reciprocal business, and some distributors are changing their manufacturer accounts because manufacturers solicited for reciprocal business are declining to grant it.

"The weakening of the resale price structure and plan is deplorable, and numerous reports of a breakdown in resale prices in the secondary market on many lines previously strongly held have come to us.

"We again call your attention to the fact that distributors urge manufacturers to assist in controlling prices in the secondary market, and where resale prices legally can be introduced, it ill-befits us to be guilty of breaking down the secondary market, to the extent of selling the manufacturers' products at prices lower than they will sell them where orders come direct to them from the consuming trade.

"The Robinson-Patman act appears still to be on the statute books, but there does not seem to be any enforcement, and from rumors reaching us from time to time, it is not being very closely observed. While a good many complaints have been entered with the federal trade commission, and some rulings have been made and cease-and-desist orders applied, it seems to be evident that discrimination is going on that cannot be justified under the law.

Resale Prices Neglected

"We also find a lack of interest in the Miller-Tydings resale price bill, which it was believed would encourage distributors to urge manufacturers to enter into resale price practices in states that have fair trade laws. Manufacturers tell us that no such demands are being made upon them by distributors. When markets that have held firmly for 12 to 15 years become as demoralized as they have in the past year on a number of lines, it seems apparent that no serious efforts are being made, either by manufacturers or distributors, to see that the market is a profitable one."

Reciprocal buying was discussed at all three group meetings and a joint resolution was adopted by each association "disapproving the practice of both manufacturer and distributor engaging in reciprocity business," outside of normal trading and servicing areas.

Before the American association, H. F. Seymour, vice president, Columbian Vise & Mfg. Co., Cleveland, and R. D. Black, sales manager, Black & Decker Co., Towson, Md., presented papers on "Resale Policies of Manufacturing; Are They Breaking Down?"

"It is my opinion that manufacturers of industrial supplies should assume a greater responsibility for the maintenance of their individual resale prices," said Mr. Seymour.

"In approaching this subject we should recognize the difference between 'maintaining' a resale price and 'policing' a resale price. We must also realize there are legal restrictions to consider. I am not relieving the distributor of his part either in maintaining or policing a manufacturer's resale price—in fact I recognize the distributor's interest as being paramount . . . .

Defines Manufacturer's Duties

"It is the manufacturer's responsibility to make his own prices, and it is his responsibility to maintain them. His responsibility does not stop just because he has taken the first step of making his own price to the distributor. The second step involving the resale price is equally as important, and the entire responsibility for its maintenance is his.

"We all know of certain products the resale prices of which are never cut by any distributor in any part of the country, yet the same distributors do cut resale prices on other products. They are the same distributors, but back of different products are different manufacturers—on the one hand, those who mean what they say when they put out a resale price; and on the other hand, those who merely put out a resale price with no thought of its maintenance.

"It has been our experience that if a manufacturer has a clear-cut resale policy, is sincerely interested in having it respected by distributors, that such manufacturer can accomplish his end to a very satisfactory degree, but not absolutely. He cannot completely control his resale policies without co-operation of all his distributors . . .

"Perhaps one of the most disturbing influences in maintaining resale prices is where the local plant of a national organization secures prices from local distributors and then sends these prices to the main office, ordinarily in a large city. Then the central purchasing department starts to shop, and often finds a better price and makes the purchase, unless the purchasing agent of the local plant is successful in breaking the local distributor's price down to a point where it equalizes the purchasing ability of the central office.

"Here the local distributor is at the mercy of that central office and also at the mercy of the direct-seller who is competing with the distributor in that locality for the business of the large buyer."

Various features of reciprocal buying again came in strongly for discussion at a sales and merchandising "clinic" held jointly by the three associations Saturday morning.

"It is largely a question of business morality," said Roger Tewksbury, president, Oster Mfg. Co., Cleveland. "Manufacturing is a simple job these days. The big job is to fill the plant; sales volume is the thing. The tendency is toward taking the immediate order, but if we could temper that tendency with consideration for the future we would not need such levers as reciprocal buying and selling.

"A company's reputation for firmness and fairness is inestimable. The loss of an immediate order may be a very fine investment, for after all, not many orders are lost by sticking to principle. The temporary loss may be considerable, but almost invariably they come back."

Only one session was held on the return voyage, May 31, when J. A. Channon, manager, *Mill Supplies*, New York, presented results of an extensive survey of industrial buying and selling related to the mill supply business, illustrated with stereopticon slides. An independent research organization was employed, a "sample" industrial city was selected, and buyers and sellers were interviewed.

Reasons for Patronage

Among reasons given by purchasers for patronizing mill supply houses were, in numerical order: Quick delivery; savings through holding down inventories; emergency services; local business deserving support; local transactions most convenient; regular contact with salesmen; savings through reducing order routine.

Distributor's competitive advantage goes down as size of purchaser's plant goes up.

Over 70 per cent of the larger consuming plants gave "price" as their reason for buying direct from manufacturers. Other reasons given for not buying more liberally from local distributor: Because the local distributor did not handle the required product; distributor's salesmen were not sufficiently posted. Still others stated they bought "direct" for reciprocity reasons.

American Supply and Machinery Manufacturers' association elected the following officers: President, D. W. Northrup, Henry G. Thomp-

(*Please turn to Page* 80)

Activities of Steel Users, Makers

■ MANUFACTURERS and Fabricators Inc. has moved its offices and plant from 4389 Martin avenue, Cleveland, to new and larger quarters in Elyria, O., where it has leased a part of the former Columbia Steel Co. plant. Additional machine tools are being installed. In addition to specializing in welded steel fabrication the company will manufacture welded alloy tubing in sizes from 1 to 6 inches in diameter.

♦

Allegheny Iron & Steel Co., Philadelphia, has moved its main offices to a building at Tacony and Lewis streets.

♦

Atlas Steel & Supply Co., Cleveland, has opened an office at 404 Grant building, Pittsburgh. S. W. Platt is district manager, and H. J. Platt, assistant manager.

♦

Reynolds Molded Plastics, a division of Reynolds Spring Co., Jackson, Mich.. has established a sales office at 601 Hanna building, Cleveland, with Robert R. Wilson in charge.

♦

Metallizing Engineering Co. Inc., Long Island City, N. Y., has consolidated its general offices, plant and warehouse in new quarters at 21-07 Forty-first avenue, Long Island City.

♦

Roots-Connersville Blower Corp., Connersville, Ind., has moved its Chicago office from room 814, 140 South Dearborn street, to room 1027, Peoples Gas building, 122 South Michigan avenue. Personnel is unchanged.

♦

Independent Pneumatic Tool Co., Chicago, has opened a branch office at 1544 Broadway, Denver, in charge of C. A. Turnquist. The new branch is staffed to render complete sales and service on the company's lines of mining and contractors equipment and portable electric and pneumatic tools.

♦

Bleakley Corp., 229 First street, Toledo, O., has been formed to exploit a new process of manufacturing molds for die castings, plastics, rubber and porcelain molding. L. D. Soubier, consulting engineer and inventor with the Owens-Illinois Glass Co., and P. A. Bleakley, vice president, are executives of the new company. Costs of the new process bring molds down to about 10 per cent of expense of older methods, it is reported.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended June 3	Change	Same week 1938	Same week 1937
Pittsburgh	42	+ 6	18	95
Chicago	53.5	+ 4.5	22.5	63
Eastern Pa.	37	None	26	71
Youngstown	48	+ 3	21	29
Wheeling	70	+11	38	96
Cleveland	53	— 1	31	46
Buffalo	44	+ 2	21	88
Birmingham	60	+ 3	69	83
New England	35	—10	27	45
Cincinnati	60	+ 8	22	96
St. Louis	37.5	— 1.5	39.3	91
Detroit	57	None	18	100
Average	52	+ 4	25.5	75

Steel Institute Takes Over Research Work

■ Research in steel technology formerly conducted by the Association of American Steel Manufacturers technical committees, Pittsburgh, has been transferred to technical committees of American Iron and Steel institute, effective June 1, it is announced by the association and the institute. Offices of the association have been closed after 40 years' activity.

Standards for chemical compositions, physical properties, rolling tolerances and other permissible variations from specified dimensions originally promulgated by the Association of American Steel Manufacturers technical committees will hereafter be sponsored by the Steel institute. and published as part of its *"Steel Products Manual."*

700 Veteran Employes Honored at Cleveland

■ Cleveland employers last week honored 700 of their workers who had served 40 years or more. Representing 130 firms, the veterans received bronze medals at a dinner sponsored by Cleveland's chamber of commerce.

Featured speaker was John A. Stephens. industrial relations director of United States Steel Corp., Pittsburgh. Outlining changes in American industrial life in the past four decades, he declared all enterprise seems to be heading toward management by "consultation" rather than by "dictation."

Companies with the largest number of veterans present included the New York Central, Erie and Pennsylvania railroads, and American Steel & Wire Co. A silver plaque went to Alfred B. Bower for 61 years' service with Lamson & Sessions Co., "longest record of uninterrupted employment in Cleveland industry."

PRODUCTION

■ STEELWORKS operations last week rose 4 points to 52 per cent, highest since mid-April. Advances were made in seven districts, and declines in three, while two remained unchanged. A year ago the rate was 25.5 per cent; two years ago 75 per cent.

Youngstown, O.—Gained 3 points to 48 per cent, due to increase in bessemer production. Schedule this week probably will show increase to 50 per cent with 44 open hearths in production.

Cleveland—Declined 1 point to 53 per cent, an increase by one interest being offset by the shutting down of two furnaces by another mill for repairs.

Birmingham, Ala.—Up 3 points to 60 per cent.

Pittsburgh—Increases by several mills brought an advance of 6 points to 42 per cent.

Wheeling—Heavier production by all interests moved the rate up 11 points to 70 per cent.

Cincinnati—Advance of 8 points to 60 per cent, highest since January. One interest is accumulating ingots to allow shutdown in July for plant improvements.

Buffalo—Rose 2 points to 44 per cent, one open hearth being added.

New England—Down 10 points to 35 per cent.

Central eastern seaboard—Unchanged at 37 per cent for the fourth week. Ingot stocks are low at most plants, with May business 20 per cent above April for some producers.

St. Louis—Loss of 1.5 points resulted from substitution of smaller furnaces, making the rate 37.5 per cent.

Chicago—Gain of 4.5 points to 53.5 per cent resulted from two interests increasing production sharply.

Detroit—Steady at 57 per cent with program for this week showing little change.

Revere Copper Honors 50 Years' Service

■ Sterling silver plaque recently presented by Revere Copper & Brass Inc. to employe Clarence S. Parker recognized completion of his fiftieth year of service. Award was made by F. J. Carroll, production manager, at a dinner of the Revere Copper & Brass Foremen's association.

Now in an advisory capacity at Revere's Taunton, Mass., plant, Mr. Parker began his service on May 1, 1889, as assistant to the foreman in the cast shop and yellow metal mill at Taunton. He became superintendent of the Taunton and New Bedford, Mass., plants in 1920.

Predict 1939 Will Establish New Peace-Time High in Shipbuilding

■ SHIPBUILDING awards, registering a gain for the fourth consecutive year, will attain a peace-time record in 1939, it is predicted in shipping circles.

Supporting this contention is the recently signed 1940 naval appropriation bill, providing funds for 24 vessels, some of which will be placed this year. Apart from a swelling volume of miscellaneous ship work, a total of possibly 50 merchant ships will be awarded by the federal maritime commission.

Bids recently were opened on four submarines and four destroyers, while the maritime commission is expected to take bids soon for 12 C-1 8000-ton merchant ships. The eight naval vessels are included in the 1940 appropriation bill. Also provided are four additional submarines, four additional destroyers, two 45,000-ton battleships, two 8000-ton cruisers and four auxiliary ships. It is estimated this program will require more than 40,000 tons of steel.

Already this year the maritime commission has placed 14 C-3 merchant ships, six going to Newport News Shipbuilding & Dry Dock Co., Newport News, Va., four to Sun Shipbuilding & Dry Dock Co., Chester, Pa., and four to Ingalls Iron Works, Birmingham, Ala.

Among other major contracts booked by private yards: Tanker for the Texas Co., Sun Shipbuilding; four 6000-ton light cruisers, two by Bethlehem Steel Co., Quincy, Mass., two by Federal Shipbuilding & Dry Dock Co., Kearny, N. J.; and one 20,000-ton aircraft carrier, Newport News Shipbuilding.

Work placed in navy yards during 1939 has been featured by award of a 35,000-ton battleship to the Norfolk, Va., yard, and one 6000-ton mine layer to the Philadelphia yard.

It is estimated steel entering ship construction this year will total at least 350,000 tons. This would compare with 308,451 tons last year and 390,460 tons in 1937, according to STEEL'S annual distribution figures, as shown in the following table:

Year	Tons of Steel For Ships, Repairs	Total Finished Steel Consumed	Percentage Consumed By Ships
1938.....	308,451	18,692,957	1.65
1937.....	320,460	32,695,349	0.98
1936.....	231,644	29,072,596	0.80
1935.....	156,890	20,819,710	0.75
1934.....	154,832	15,870,696	0.98
1933.....	89,344	13,743,121	0.65
1932.....	79,650	9,317,974	0.86
1931.....	179,181	17,396,997	1.03
1930.....	308,491	25,769,914	1.20
1929.....	296,554	36,157,095	0.82
1928.....	150,352	28,537,621	0.53

While the volume of ship work placed last year was greater than in 1937, the actual quantity of steel consumed was approximately 12,000 tons less. This is accounted for by the lag between placing of ships and consumption of the required steel.

Heavy peace-time building activity in 1929 and 1930, as shown in the foregoing table, was largely due to the maritime commission's predecessor, the shipping board, which in the 20's promoted considerable construction in connection with its renewal of mail contracts. Today the maritime commission's program calls for subsidies to American shiplines, based on differentials in building and operating costs as compared with competitive costs abroad.

It is believed the peak of steel consumption in connection with present shipbuilding programs will not come until 1940 or 1941. Many of the vessels now on order, both naval and commercial, were not placed until late in 1938 or early 1939. However, requirements of the allied industries which furnish materials and build equipment for these vessels are expected to be placed soon.

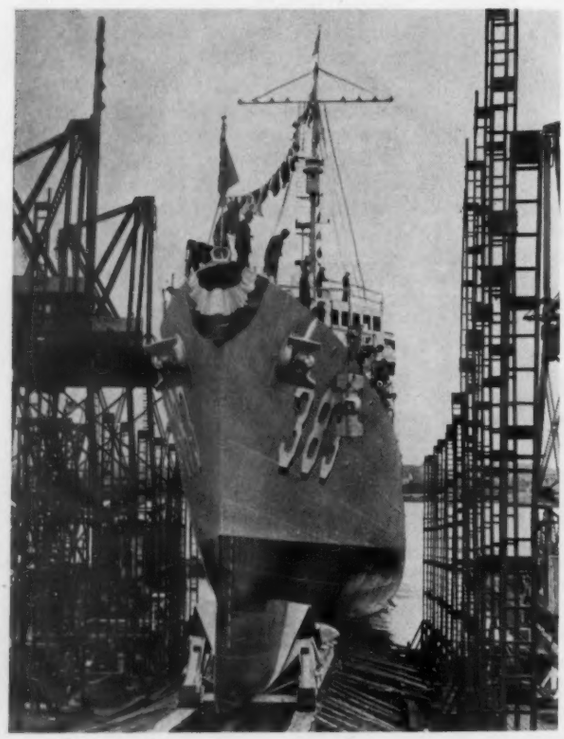
This country's rapid progress in merchant ship construction, making her the world's second largest builder, is reflected in figures issued by Lloyd's Register for the first quarter of 1939. On March 31 ships on order totaled 420,931 gross tons, 40 per cent more than the 298,617 tons on Dec. 31, 1938. Great Britain, No. 1 builder, on March 31 had 596,903 gross tons on order, against 779,762 tons Dec. 31, a decline of 25 per cent.

Designing Faster Vessels

Trend in commercial ships, according to H. Gerrish Smith, president, National Council of American Shipbuilders, New York, is toward higher speeds, greater capacity, higher ratio of cubic capacity to deadweight in hull, and higher pressure and higher temperatures in machinery design.

Now under consideration are 12 high-speed tankers, similar to those being built for Standard Oil Co. of New Jersey and the navy department. But these are not regarded likely to become active for some time. Plans and specifications for three cargo ships for the Seas Shipping Co. have been completed by George C. Sharp, naval architect, New York, and bids on these ships may be asked through the maritime commission.

Other private companies with building programs include the United States Line, three or four ships for its New York-London service; Mississippi Shipping Co., three passenger-cargo boats for its Gulf-South American run; New York & Cuba Mail Steamship Co., a passenger ship and three cargo boats; Lykes Bros. Steamship Co., five cargo vessels; and South Atlantic Steamship Co., five cargo vessels.



◆

Navy Ship Down the Ways

■ **Fighting craft for Uncle Sam are prominent in shipyards today humming with record peace-time activity. Shown launching at Kearny, N. J., yard of Federal Shipbuilding & Drydock Co. is a modern destroyer. NEA photo**

May Pig Iron Production Down 19.2 Per Cent; Five Stacks Added

■ PRODUCTION of coke pig iron in the United States in May showed effect of the reduced operations occasioned by the prospective coal shortage. Average daily output was 55,373 gross tons, 13,138 tons, or 19.2 per cent, less than the April daily average of 68,511 tons, despite a net increase of five active stacks at the end of May.

Total production during May was 1,716,544 gross tons, a decrease of 338,782 tons, or 16.5 per cent, compared with April total of 2,055,326 tons. This was lowest since September, 1938, when 1,683,097 tons were made. During May, a year ago, total production was 1,260,937 tons.

Output for first five months this year amounted to 10,400,731 tons, an increase of 3,530,380 tons, or 51.4 per cent, compared with the 6,870,351 tons made in the like period of 1938. Output for first five months of 1937 totaled 16,656,033 tons.

Relating production to capacity, operations in May averaged 40.3 per cent. This compared with 50 per cent in April and 56 per cent in March and was lowest since August, 1938, with 34.8 per cent. Rate for May, a year ago, was 29.4 per cent.

Number of stacks in blast May 31 was 107, an increase of five compared with 102 at end of April. During May, one merchant stack and nine steelworks furnaces were made active and five steelworks units were blown out or banked to raise the total to 107. This was highest since March 31 when 123 were in operation.

Furnaces blown in during May were: In Alabama: Ensley Nos. 1 and 2, Tennessee Coal, Iron & R. R. Co. In Maryland: Maryland "A," Bethlehem Steel Co. In Michigan: One Detroit, National Steel Corp. In Ohio: Hubbard, O. No. 1, Youngstown Sheet & Tube Co. In Pennsylvania: One Donora, American Steel & Wire Co.; Bethlehem "D" and Cambria "L," Bethlehem Steel Co.; Duquesne No. 4 and Edgar Thomson "D," Carnegie-Illinois Steel Corp.

Stacks blown out or banked were: In Alabama: Pioneer No. 1, Republic Steel Corp. In Ohio: Lorain No. 4, National Tube Co.; one Canton, Republic Steel Corp. In Pennsylvania: Bethlehem "G," Bethlehem Steel Co.; Mononghela No. 2, National Tube Co.

MONTHLY IRON PRODUCTION

Gross Tons

	1939	1938	1937
Jan.	2,175,423	1,444,862	3,219,741
Feb.	2,060,183	1,306,333	3,020,006
March	2,393,255	1,470,211	3,470,470
April	2,055,326	1,388,008	3,400,636
May	1,716,544	1,260,937	3,545,180
Tot. 5 mo.	10,400,731	6,870,351	16,656,033
June	.....	1,060,747	3,115,302
July	.....	1,213,076	3,501,359
Aug.	.....	1,495,514	3,616,954
Sept.	.....	1,683,097	3,417,960
Oct.	.....	2,067,499	2,891,026
Nov.	.....	2,286,661	2,007,031
Dec.	.....	2,212,718	1,503,474
Total	.....	18,889,663	36,709,139

AVERAGE DAILY PRODUCTION

Gross Tons

	1939	1938	1937	1936
Jan.	70,175	46,608	103.863	65,461
Feb.	73,578	46,655	107,857	63,411
March	77,201	47,426	111,951	66,004
April	68,511	46,267	113,354	80,316
May	55,373	40,675	114,360	85,795
June	.....	35,358	103,843	86,551
July	.....	39,131	112,947	83,735
Aug.	.....	48,242	116,676	87,475
Sept.	.....	56,103	113.932	90,942
Oct.	.....	66,694	93,259	96,509
Nov.	.....	76,222	66,901	98,331
Dec.	.....	71,378	48,499	100,813
Ave.	68,905	51,752	100,573	83,832

Steel Industry Payrolls, Employment Off in April

■ Reflecting the drop in steel production between March and April, employment and payrolls of the steel industry during April were below the March figures, according to the American Iron and Steel institute.

A total of 452,000 employes were at work during April, less than 1 per cent below the March figure of 455,000. By comparison, steel ingot output in April was 12 per cent below March.

April payrolls totaled $58,517,000, a decline of 9 per cent from March payrolls of $64,174,000.

Wage-earning employes earned an average of 82.9 cents per hour in April, against 82.8 cents in March and 82.6 cents in April last year. Number of hours worked per week by wage earners averaged 32.1 in April, compared with 34.7 in March and 25.6 in April 1938.

RATE OF OPERATION

(Relation of Production to Capacity)

	1939[1]	1938[2]	1937[3]	1936[4]
Jan.	51.0	33.6	76.6	48.2
Feb.	53.5	33.6	79.5	46.4
March	56.1	34.2	82.5	48.5
April	49.8	33.4	83.7	59.1
May	40.3	29.4	84.3	63.1
June	....	25.5	76.6	63.6
July	....	28.2	82.9	61.5
Aug.	....	34.8	85.7	64.3
Sept.	....	40.5	83.7	66.9
Oct.	....	48.0	68.4	71.0
Nov.	....	55.0	49.3	72.3
Dec.	....	51.4	35.6	74.2

[1] Based on capacity of 50,198,920 gross tons, Dec. 31, 1938; [2] capacity of 50.606,400 gross tons, Dec. 31, 1937; [3] first half on capacity of 49,512,737 tons, Dec. 31, 1936—second half on capacity of 49,727,737 tons, June 30, 1937; [4] capacity of 49,777,893 tons, Dec. 31, 1935. Capacities by American Iron and Steel institute.

Steel for Household Goods Down in 1938

■ Consumers' purchases of nearly 3,863,000 refrigerators, kitchen ranges and electric washing machines represented a market for approximately 260,000 gross tons of steel during 1938, estimates the American Iron and Steel institute.

The sharp reduction from the record total of 6,691,000 units sold in 1937, which represented a market for 461,000 tons of steel, coincided almost exactly with the rate of decline in total tonnage of steel produced between 1937 and 1938.

Approximately 121,000 gross tons of steel were used in manufacturing 1,425,000 gas and electric refrigerators last year. Steel for 1,300,000 gas and electric ranges totaled approximately 110,000 gross tons. Approximately 29,000 tons were used in 1,138,000 washing machines.

MAY IRON PRODUCTION

	No. in blast last day of May	No. in blast last day of Apr.	Total tonnage Merchant	Total tonnage Non-merchant
Alabama	12	11	59,720	97,613
Illinois	7	7	43,916	101,028
New York	7	7	8,192	115,820
Ohio	23	24	41,919	321,650*
Penna.	33	30	26,876*	423,167*
Colorado	2	2		
Indiana	8	8	6,242*	335,875
Maryland	5	4		
Virginia	1	1		
Kentucky	1	1		
Mass.	0	0		
Michigan	4	3		
Minnesota	1	1	0	134,526
Missouri	0	0		
Tenn.	0	0		
Utah	1	1		
West Va.	2	2		
Total	107	102	186,865*	1,529,679*

*Includes ferromanganese and spiegeleisen.

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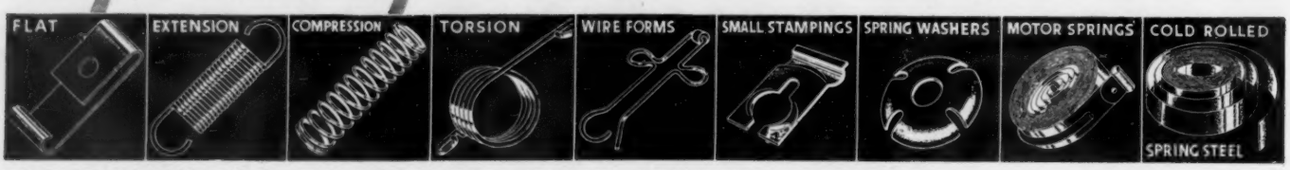


SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ MOST IMPORTANT matter at the nation's capital last week was the tax situation on which the house ways and means committee has been holding hearings. Considerable difference of thought exists among members of both houses as to how the tax situation should be handled. There is unanimity of opinion, however, that present nuisance taxes, which expire June 30 and which net the government about half a billion dollars a year, must be renewed.

As is well known, secretary of the Treasury Morgenthau and Undersecretary John W. Hanes have both been in favor of revamping the taxes which are claimed to be a deterrent to better business.

Appearing before the ways and means committee last week, Secretary Morgenthau suggested — but did not "recommend"—provision in income tax laws to permit business to carry over its net losses in one year to be deducted from business profits of future years be one of the matters taken under consideration.

Would Drop Profits Tax

Also the repeal or lapsing of the undistributed profits tax which has been referred to as a deterrent. Another matter which he thought the committee should take up is repeal of the capital stock tax and the related excess profits tax and also legislation to make it impossible in the future to issue tax-exempt securities, There is much controversy on this last point, and suggestion has been made that this be separated from the regular tax legislation.

Secretary Morgenthau told the committee in some detail of plans for tax changes which have been worked out by his department and in connection with some immediate revision he suggested a provision for long-range study of the whole revenue situation which would be undertaken by the senate finance committee, the house ways and means committee and the appropriation committees of both houses of congress.

He pointed out that the budget act originally set up procedure for a unified budget, but no such comparable procedure was accomplished in the budget act by congress for revenues and expenditures.

Apparent agreement on the tax situation has been reached by the congressional leaders and the White House. The one thing the President is insisting upon, however, is that the amount of taxes to be collected by the government under any new tax bill will equal those which are now being received. Also the President has insisted that the tax burden should not be shifted from one class of tax payers to another, by which he apparently has in mind that taxation on large corporations shall not be cut so that smaller corporations will have to pay increased taxes.

Among tax problems which confront the treasury, Secretary Morgenthau pointed out is the limitation now placed on the deduction on capital loss. Under the present law, an excess of corporate capital losses over capital gains can be deducted from ordinary income only to the extent of $2000. This is one category of tax problems which raises the question of tax equity, he said, and suggested it as the subject of further study on the ground that hasty tax revision might mean the loss of revenue. The Morgenthau statement made to the committee had the approval of the President, it is reported.

NLRB TO CHANGE RULES TO AID EMPLOYERS

J. Warren Madden, chairman of the national labor relations board, told the house committee on labor at a hearing last week that the board will amend its regulations shortly to give employers the right to ask for collective bargaining election under some circumstances. Madden told the house committee that the board has the power to permit such procedure but without safeguards "it would do no good and would do much harm."

Members of the house committee questioned Madden as to why his board hadn't taken this action before in order to stamp out the criticism.

In answer Madden said: "I haven't the slightest doubt the board will make a change in that direction, but as long as the hearings are going on we thought we should get the benefit of the testimony of witnesses and the advice of you congressmen as to what you think would be desirable."

HULL WOULD HAVE ARMS EMBARGO ELIMINATED

Neutrality question is causing considerable controversy and there are indications that the house and senate do not feel the same about the neutrality law.

Secretary of State Hull last week sent a communication to the chairman of the senate foreign relations committee and the house committee on foreign affairs which sets forth for the first time the administration's policy on this subject.

Among other things Secretary Hull recommended continuation of the national munitions control board and the present system of arms export and import licenses. He recommended also continuing existing legislation respecting loans and credits to nations at war and the provision that the export of goods destined for belligerents shall be preceded by transfer of title to the foreign purchaser.

"It is my firm conviction," said the secretary, "that the arms embargo provision of the existing law should be eliminated." Mr. Hull further recommended that provisions be enacted into a new neutrality law to prohibit American ships, irrespec-

tive of what they might be carrying, from entering combat areas and restriction of travel of American citizens in combat areas. Also a provision to regulate the collection of funds for belligerents.

"Provisions along suggested lines would, I think," Secretary Hull said, "help to keep this country out of war and facilitate our adherence to a position of neutrality. They would make easier our two-fold task of keeping this country at peace and avoiding imposition of unnecessary and abnormal burdens upon our citizens."

Discussing the embargo situation further, the secretary said:

"If we go in for embargoes on exports, for the purpose of keeping ourselves out of war, the logical thing to do would be to make our embargo all-inclusive. Modern warfare is no longer warfare between armed forces only; it is warfare between nations in every phase of their national life. Lists of contraband are no longer limited to arms and ammunition and closely related commodities. They include not only those items which contribute toward making warfare possible, but almost every item useful in the life of the enemy nation.

"A nation at war is no less anxious to keep cotton or petroleum, or, indeed, any useful product, from reaching an enemy nation than it is to keep guns and airplanes from reaching the enemy's armed forces. I doubt whether we can help ourselves to keep out of war by an attempt on our part to distinguish between categories of exports. Yet a complete embargo upon all exports would obviously be ruinous to our economic life. It therefore seems clear that we should have no general and automatic embargo inflexibly and rigidly imposed on any class or group of exports."

WAGE-HOUR AMENDMENT AGREEMENT IS REACHED

An agreement has been reached between Mrs. Norton, chairman of the house committee on labor, and the agricultural bloc of the house regarding administration amendments to the wage-hour law. Under this agreement Mrs. Norton expects to bring the amendments up for action by the house June 5. The agreement specifically provides that the Norton committee will not ask for any amendments related in any way to agriculture.

A couple of weeks ago, Mrs. Norton had asked the house to vote on administration amendments to the wage-hour act but changed her plans because of the opposition of the farm bloc in the house. They strenuously objected to proposals for restricting exemption of certain farm workers from the minimum wage provisions. Unless something unexpected develops, it is anticipated the amendments will be passed.

PRESIDENT AND BUSINESS MEN DISCUSS EMPLOYMENT

Edward R. Stettinius Jr., chairman of the board, United States Steel Corp.; Charles R. Hook, president, American Rolling Mill Co.; Charles C. Conway, chairman, Continental Can Co.; Gano Dunn, president, White Engineering Co.; and several other members of the commerce department's business advisory council had dinner at the White House Thursday night, followed by a conference with the President.

Secretary of Commerce Hopkins stated at press conference Friday that the Thursday night dinner for business executives was an attempt to get a reasonable meeting of minds between the administration and business. He said the President was interested in having further conferences either with this group or some other group of business executives.

Mr. Hopkins said the discussion ran the whole gamut of economic conditions in America dealing with the government and business. Among other matters discussed, the secretary said, was the relationship between labor, industry and the government. He said there was also discussion of a labor relations act and foreign trade with special emphasis on South America.

The business men, Mr. Hopkins said, made individual statements to the President regarding their own problems and the progress of their firms.

The dinner conference was at Hopkins' request to the President. The secretary said the business advisory council which has been meeting in Washington for the past couple of days has been working out several important confidential reports for his own use, and these, he said, will not be made public.

BILL PROVIDES LOANS FOR SMALL BUSINESS

Representative Sabath, Illinois, introduced a bill in the house last week (H. R. 6448) which has been referred to the banking and currency committee, providing for liberalization of credit to small businesses.

The bill contemplates placing into active use millions of dollars now frozen and lying idle in vaults of the banks. A paradoxical situation has arisen. Business requires additional capital, and such capital is available. Yet the medium, instrumentality or "missing link" to bring these forces into play as yet remains undevised. As justification for the refusal to extend credit, the banks blame unnecessarily rigid restrictions to which they are subjected. It is the purpose of the proposed act to alleviate this condition. To keep the wheels of industry turning, sufficient credit to honest and reputable business men of long standing must be established.

Some of the salient features of the proposed bill provide that:

An instrument in the nature of trade acceptance certificates be created. These certificates are to be eligible for discount through federal reserve banks or through a corporation to be established under the President's recent "first plan for government reorganization," designating the federal loan administrator as co-ordinator of all money-lending agencies. The said trade acceptance certificates are to be issued by a trustee designated by persons directly interested in transactions related to buying, selling, manufacturing or producing goods.

STRATEGIC MINERALS FUND PRACTICALLY ASSURED

The house has adopted the conference report on strategic minerals providing for expenditure of $100,000,000 in four years for stock piles. The report now has only to be adopted by the senate and sent to the White House for signature.

Pennsylvania Legislators Outlaw Sitdown Strike

■ Pennsylvania's legislature last week passed a bill to outlaw sitdown strikes and otherwise limit labor union activities. The measure drastically revises the state's "little Wagner act" passed during the preceding administration.

Similar curbs on illegal union activities have been enacted in other states during the past year (STEEL, May 15, p. 23).

The Pennsylvania act declares it an unfair labor practice for an employe, union, or union officer to intimidate, restrain or coerce: Any employe by threats of force, or violence, or harm with the intent of compelling employe to join or to refrain from joining a labor organization; any employer with the intent of compelling employer to accede to demands, conditions, and terms of employment.

The act would require the labor board to respect craft unions' rights to decide for themselves by majority vote who should be their bargaining representative; curtail the board's power to invalidate legal contracts between employer and employe.

Measure also permits employers to petition the state labor board for a collective bargaining election.

AVIATION

EQUIPMENT BUYING SPURRED BY EXPANDING AIR TRAFFIC

■ SHARP gains in air travel are resulting in steadily growing demand for transport equipment, it is indicated by builders.

Contrasting with the poor showing of transportation in general during 1938, airline passengers increased 21 per cent to 1,536,111; revenue miles flown were up 5 per cent to 81,058,127; and air express totaled 9,452,600 pounds, up 5.22 per cent. Leading carriers report traffic last month was best in history.

Pan American Airways' inception last week of the first scheduled service between the United States and Europe gives this country a dominant position on what is foreseen the world's "blue ribbon" air route. Already having allotted four 74-passenger, 42-ton Boeing Clippers for its transatlantic operations, Pan American is expected to require additional planes.

Douglas Aircraft Co. Inc. has just delivered to American Airlines five new DC-3 passenger craft. This line now flies 53 Douglas units. Douglas recently turned over to United Airlines for testing its giant landplane, the 42-passenger DC-4, developed at cost of $2,000,000. United anticipates ordering seven such ships, while options are held by four other lines. Royal Dutch Airlines is interested in purchasing six.

United soon will remove its operating base from Cheyenne, Wyo., to Oakland, Calif., building new maintenance shops, power house and machine shop at cost of $500,000, including equipment.

Newly-formed at Modesto, Calif., Transair Inc. plans to manufacture tri-motored transports. Company will finance a new plant with 600,000 shares of common stock.

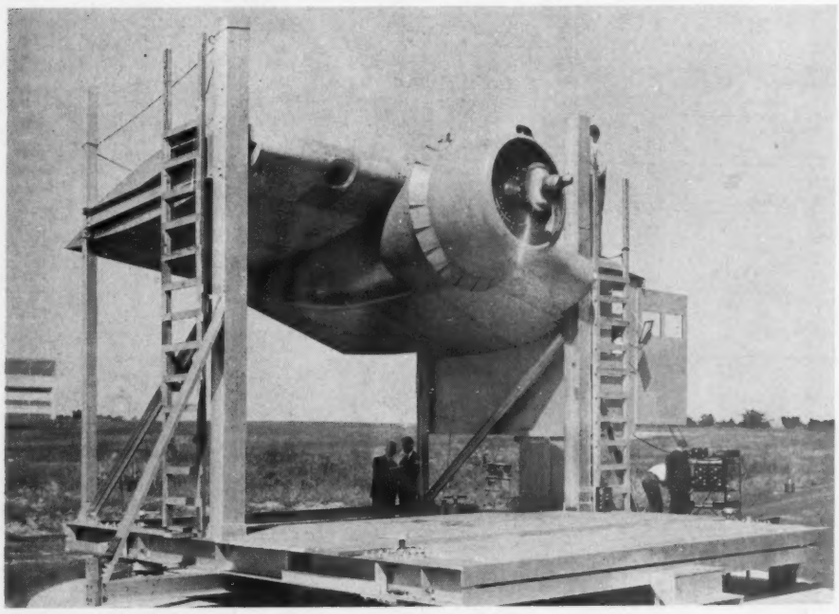
Harvill Aircraft Die Casting Corp., Los Angeles, is issuing additional common stock, will buy machinery and equipment for producing aeronautical die-castings.

Federal Orders Allotted

Government aeronautical orders placed last week: For the army air corps, Curtiss Propeller division of Curtiss-Wright Corp., Clifton, N. J., hub and booster assemblies, $94,627; Breeze Corporations Inc., Newark, N. J., fuel indicators, $58,500; and Weston Electrical Instrument Corp., Newark, N. J., indicators, $37,968; for the navy, Wright Aeronautical Corp., Paterson, N. J., engine parts, $58,250.

Six hydraulic presses of the double-action, electrical-drive type were recently delivered to airplane makers by Baldwin-Southwark Corp., Eddystone, Pa. Three have 2050-ton capacity, three 280-ton.

Ground-Testing New Power Plant



■ New engine models are ground-tested at Glenn L. Martin Co.'s Middle River, Md., plant with this special rig. Mounted over a turntable in mock-up nacelle and wing section, the engine is operated four weeks under varying conditions. Observers in "balcony" check and record its performance. The equipment is said to reduce test-flying time as much as 50 per cent

MEETINGS

HERBERT HOOVER TO MAKE ENGINEERS' DAY ADDRESS

■ NATIONAL semiannual meeting of the American Society of Mechanical Engineers at the Fairmont hotel, San Francisco, July 10-15, will be keyed to the theme "greater service to science, industry and humanity." In connection with this meeting, Golden Gate International exposition has designated July 13 as Engineers' Day, the main feature of which will be an address by Former President Herbert Hoover, an honorary member of the A. S. M. E., on the contributions which engineering has made to human welfare.

The San Francisco meeting schedules 14 technical sessions sponsored by the aeronautic, fuel, hydraulic, heat transfer, power, management, process industries, oil and gas power, and materials handling divisions. Dr. Rodolfo E. Ballester, engineer and director, irrigation department of Argentina, South America, will present the fifth Calvin W. Rice lecture. He will discuss hydraulics and how American engineers may better co-operate with those of South America.

ELECTRICAL ENGINEERS TO MEET ON PACIFIC COAST

American Institute of Electrical Engineers will conduct its summer and Pacific Coast convention at the Fairmont hotel, San Francisco, June 26-30. At the opening session, F. M. Farmer, vice president, Electrical Testing Laboratories, New York, will be inducted into office as president. Marion A. Savage, designing engineer, General Electric Co., Schenectady, N. Y., will receive the Lamme medal "for able and original work in development and improvement of mechanical construction and efficiency of large high-speed turbine alternators."

World Tin Production At Five-Year Low

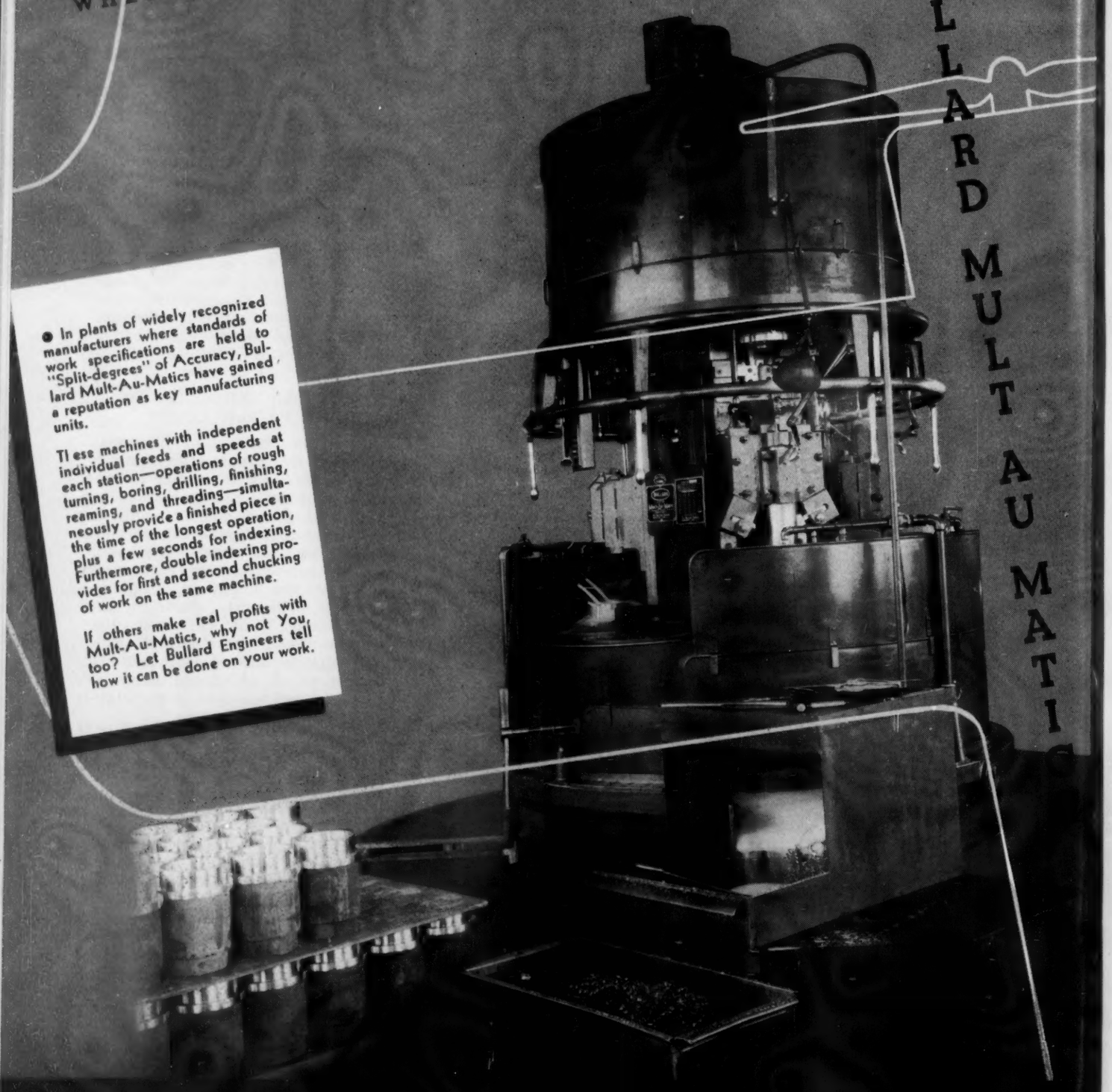
■ March world tin production is estimated at 7500 gross tons, lowest figure for more than five years. This brings first quarter output to 33,400 tons, a decrease of 23 per cent from first quarter, 1938, according to International Tin Research and Development council, The Hague.

World apparent tin consumption in March was 13,400 tons; for first quarter 35,700 tons, a decrease of 13 per cent from first quarter last year. World tin plate production in first quarter amounted to 950,000 tons, an increase of 24 per cent over 766,000 tons made in first quarter, 1938.

AT CURTISS WRIGHT

WHERE "SPLIT DEGREES" OF ACCURACY ARE DEMANDED

BULLARD MULT AU MATIC



● In plants of widely recognized manufacturers where standards of work specifications are held to "Split-degrees" of Accuracy, Bullard Mult-Au-Matics have gained a reputation as key manufacturing units.

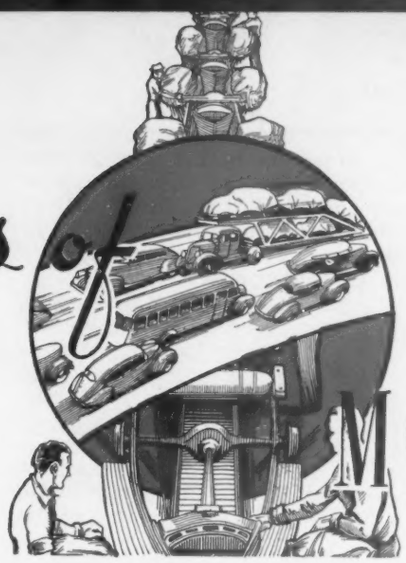
These machines with independent individual feeds and speeds at each station—operations of rough turning, boring, drilling, finishing, reaming, and threading—simultaneously provide a finished piece in the time of the longest operation, plus a few seconds for indexing. Furthermore, double indexing provides for first and second chucking of work on the same machine.

If others make real profits with Mult-Au-Matics, why not You, too? Let Bullard Engineers tell how it can be done on your work.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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■ PRODUCTIONWISE, last week was a complete dud in the motor industry, the combination of a holiday, enforced shutdowns at Chrysler plants (except Dodge Truck) and a week's suspension of assemblies by Ford combining to slash total car assemblies to the lowest point of the year.

At midweek, settlement of the Briggs dispute, which is costing 70,000 automobile workers an estimated $500,000 daily in wages, appeared possible, although no particular pressure was being brought on the opposing factions for an early peace. The matter was thrown in the lap of federal conciliator James F. Dewey, who, privately, was reported pessimistic over likelihood of any quick adjustment. Both sides publicly stated they would abide by whatever decision Dewey reached, but it takes no searching analysis to conclude the UAW-CIO group will not step down from its position and thus lose some of the militancy which has characterized its actions from the start of the strike.

Struggle for Dominance

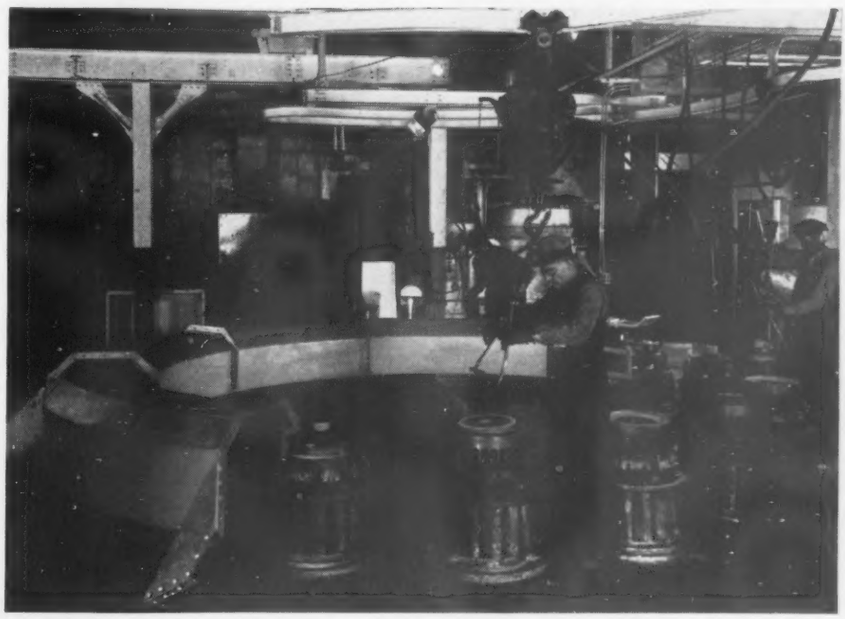
The entire affair is nothing more than a display of strength by the union group which is sparing no punches in its campaign to demonstrate its dominance of automotive labor. Adherents of Homer Martin, erstwhile head of the UAW, have been doing a little minor sniping at the UAW-CIO group, one foray the other evening at a Briggs plant on Eight-Mile road resulting in several smashed cars, one wounded combatant and several bruised. However, Martin seems to be fighting a losing cause and unless he can effect an early tieup with the AFL his day will be over around Detroit.

No demands have emanated from Chrysler quarters for a speedy resumption of body operations at Briggs, on which Chrysler is dependent—and probably for two reasons. One is that Chrysler is faced with a rather delicate labor situation itself and any pressure on Briggs might only bring out disturbances at Chrysler next. The other is that dealers generally are well fixed on supplies of new cars and beyond occasional instances where shortages have occurred, are not pressing for shipments.

The most unfortunate aspect of the trouble has been the suspension of activity in Briggs die departments which were working overtime on requirements for 1940 models. The two weeks delay already incurred conceivably may force some readjustment of new model introductions, but is not likely to have an immediate effect on the customary round of sales conferences and other preliminaries which precede the introduction of new cars. The only effect will be on production dates which have been established on the various Chrysler lines.

Some diemakers at Briggs, seriously disturbed over the loss of

Casting Gear Blanks in Centrifugal Dies



■ **Ring gear blanks now are cast in centrifugal dies at Ford Motor Co.'s Rouge plant. Under development for more than two years, process employs a turntable mounting 18 spinning dies. In a four-minute cycle, one operator loads the dies, another pours molten steel, a third removes finished blanks. Centrifugal casting is faster and simpler than forging, produces stronger gears, say company's metallurgists**

extra good wages they were earning, have been going around to the smaller local die shops seeking to get jobs, and a few of them have been hired. One die shop here, working day and night, and even throughout Memorial day, put on several Briggs men, reasoning that good workmen are difficult enough to find, and it would be folly to refuse a job to an efficient man when ample work is available.

This is the lush season for diemakers and with a base wage rate of $1.30 per hour, time and a half for overtime and double time for Sundays, a good man probably can earn $100 per week. Thus it is easy to see why men, idle because their union leaders have called a strike in protest against a company's failure to settle 28 minor plant grievances, take steps to re-establish their earning power. The busy season on dies has only about three more months to run, so the hay must be made while the sun shines.

The smaller die shops around the city report all the work they can handle at the moment, and a considerable volume yet to be closed. One shop has sufficient work to keep busy well into September, employment at two-thirds of peak and business at about the level of 1936 which, for Detroit interests, was above the level of 1937. This suggests that perhaps some of the die work which has gravitated away from Detroit because of high labor rates has returned this year. The explanation is believed to lie in the good deliveries which can be guaranteed by Detroit die shops, plus the fact that quality of work is known to be high. These two factors apparently outweigh the almost 50 per cent premium on labor rates for local shops.

■ THE WEEK'S suspension in assemblies by Ford was not generally anticipated, but is believed to have been planned so that production schedules for the balance of the run on this year's models could be rearranged and a general balancing out of stocks could be effected. Assemblies will resume this week on the basis of about 2300 daily, including 350 Mercurys, 250 of the 60 model and 1700 deluxe models, representing a scaling down of about 50 per cent from the 20,000 weekly production in force before last week. These figures indicate a 7 to 1 ratio in production between the deluxe model and the standard or 60 model, and are typical of what other producers have encountered this year in respect to standard vs. deluxe models.

Meanwhile tractor production for June at the Ford plant has been set at a reported 200 units, with requests out for additional equipment which would permit boosting this output to 200 per day on short notice. The tractor engine, by the way, is practically a replica of half of the Mercury engine, with the block vertical, naturally. Bore, stroke and other details are the same, and many parts are interchangeable.

Ford engine designers are expending considerable energy in the direction of reducing weight of the present engine in the interest of increasing power and economy. Perfection of the new high-octane fuels by oil companies has stimulated all engine designers toward stepping up compression ratios and reducing weight, so that more efficient power plants can be achieved. In one motor design, identified as 91AX, Ford engineers are understood to have lowered block weight 50 to 60 pounds by thinning certain sections and reducing ribbing to a minimum. Of course, this is purely an experimental undertaking and as yet is said not to be approved by the engineering department. It merely indicates what motor builders are contemplating in forthcoming designs.

Ford appears definitely committed to engines of higher horsepower and size, such as those in the present 85 model and in the Mercury. Some discussion even is heard of eventually making the 95-horsepower engine the standard plant in the deluxe model and putting further improvements in the Mercury engine. Talk of small, lightweight engines in process of development by Ford is believed to be based largely on work being done for European cars and not for any future domestic product.

■ NEW sand casting aluminum alloy for use in aircraft engines has been developed by the National Bronze & Aluminum Foundry Co., Cleveland, and is reported to show good properties at comparatively high temperatures. From tests made at Wright field, Dayton, O., the army air corps has approved the alloy and designated it as ESMR-M56-3346. It is known as a T-1 aluminum alloy containing 95 per cent aluminum, and the following maximum percentages of other elements: Copper, 1.57 per cent; tin 1.5 per cent; magnesium 0.90 per cent; zinc 1 per cent; titanium 0.4 per cent and chromium 0.4 per cent. At temperatures of 500-750 degrees Fahr. it shows tensile strengths ranging from 15,000 to 18,000 pounds per square inch and maintains relatively low elongation of 4 per cent in 2 inches. Maintenance of physicals at these high temperatures is expected to recommend the alloy for numerous uses in aircraft engines.

Automobile designs are no exception when it comes to making use of articles and devices which capture the public eye at the moment—airplanes for example. The new Nash lines will illustrate this point by making use of catwalks shaped almost precisely like an airplane wing and extending out from either side of a long, narrow radiator shell about 12-14 inches before blending into the front fenders. Below these "airplane wing catwalks" will be vertical bars of bright metal, spaced closely and giving a sort of waterfall effect. Viewed from the front, the suggestion of airplane wings is unmistakable.

Chevrolet sales for the second ten days of May totaled 25,891 cars and trucks, an increase of 36.4 per cent over the corresponding period a year ago.

Edward L. Allen, of Standard Products Co., plastics manufacturer, told the World Automotive Engineering Congress in New York that he visions the day when "we will walk up to our car, push a button and the door will open. The seats will be light, movable chairs and the floor will be wide and flat. A portion of the roof will be made of a curved translucent material which will admit the health-giving rays of the sun, at the same time removing glare. A series of buttons will regulate the temperature and humidity to any desired condition of air. Pressing another button will unfold a concealed bed from out of the partition between the passenger and engine compartments. Many little conveniences, such as toilet and lavatory facilities, will be installed."

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
April	553,231	238,133	354,263
4 mos.	1,855,339	906,475	1,409,839
May	540,377	210,183	*306,000
June	521,153	189,399	.....
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

Estimated by *Ward's Reports*

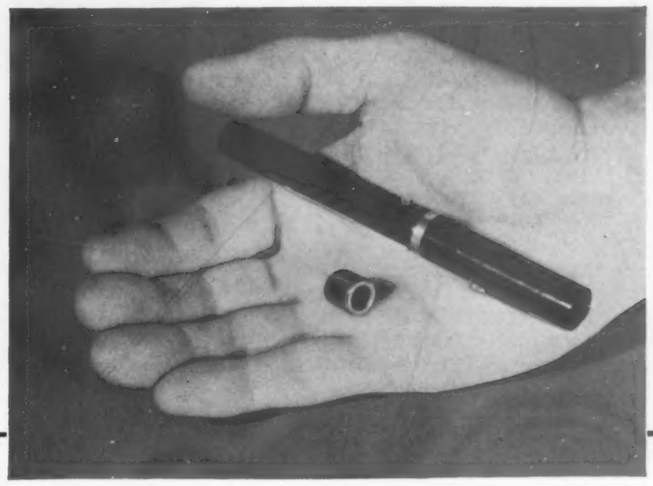
Week ended:	1939	1938†
May 6	71,420	53,385
May 13	72,375	47,415
May 20	80,145	46,810
May 27	67,740	45,120
June 3	32,445	26,980

†Comparable week.

	Week Ended June 3	Week Ended May 27
General Motors	23,670	31,680
Chrysler	1,100	5,650
Ford	1,600	20,350
All others	6,075	10,060

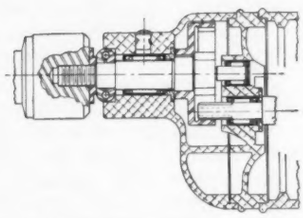
WHEN SPACE IS AT A PREMIUM

use the TORRINGTON Needle Bearing



Do space limitations in the design of your products seem to demand the use of plain bushings? Then you can frequently secure the advantages of anti-friction construction by changing over to the Torrington Needle Bearing.

Because of its simple design and its small diameter, the Needle Bearing can often be substituted for a plain bushing without requiring additional space. Consider, for example, the portable drill illustrated—a typical application where space is at a premium. See how easily three Needle Bearings were incorporated in the design. In most cases the Needle Bearing can be mounted in your present housings; a change in the size of housing bore is the only design modification needed to accommodate the bearing.



The Torrington Needle Bearing in a portable drill — A typical instance of its use in a limited space

Change is Inexpensive

You will find the change-over to anti-friction construction surprisingly inexpensive. The Needle Bearing is lower in unit cost than other types of anti-friction bearings, and its installation involves little labor expense. Built as a single compact unit, with the rollers permanently assembled in a hardened retaining shell, the bearing is readily pressed into position in the housing bore.

Your customers will appreciate the greater efficiency of the Needle Bearing, and the small amount of service attention it requires. Lubrication is efficient and thorough. The retaining shell, provided with turned-in lips, forms a reservoir for grease or oil, and the rotation of the needles constantly supplies lubricant to the rotating shaft.

The Needle Bearing is ideally suited for severe service in high-speed application. Its full complement of rollers provides many linear inches of contact, with consequent high radial load capacity.

If you are using plain bushings because of space limitations, investigate the possibilities of this small anti-friction bearing. The Torrington Engineering Department will assist you in laying out applications.

For further information, write for Catalog No.10. For Needle Bearings to be used in heavier service, request Booklet No. 103X from our associate, Bantam Bearings Corporation, South Bend, Ind.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.
Makers of Ball and Needle Bearings
Branch Offices in all Principal Cities

TORRINGTON NEEDLE BEARING

MEN OF INDUSTRY

■ F. E. VIGOR, manager, Ashland, Ky., division, American Rolling Mill Co., Middletown, O., has been promoted to general transportation manager, with headquarters in Middletown. R. R. Smith, since 1930 general superintendent, Ashland division, succeeds Mr. Vigor as manager, and R. G. Adair, assistant director of personal and public relations, has become assistant manager of Armco operations in Ashland.

Mr. Vigor, in addition to becoming general transportation manager will be associated in the management of the company's coal and ore properties and river transportation. He has been associated with Armco since June, 1910, when he was employed as chief clerk in the traffic department.

Mr. Smith joined Armco in 1912 as a foreman in the sheet mills, later becoming sheet mill superintendent. In 1922 he was transferred to Ashland. Mr. Adair, associated with the company since 1917, has held several important positions in Armco's personal and public relations activities.

Other Armco appointments include: K. C. McCutcheon as general superintendent of the Ashland plant; W. Fred Songer, assistant to manager at Ashland; W. F. Johnston, assistant to general superintendent, Middletown plant; and J. W. Paton, special representative in charge of Armco's properties at Ashland.

♦

Henry A. Weyer, engineer, formerly with the Nazel Engineering & Machine Works, Philadelphia, is now associated with the Chambersburg Engineering Co., Philadelphia.

♦

Joseph C. Elliff has resigned as western manager, *Saturday Evening Post*, to join the Stewart-Warner Corp., Chicago, in an executive sales capacity, effective June 15.

♦

Vincent H. Godfrey has been added to the general sales staff of Page Steel & Wire division, American Chain & Cable Co. Inc., Bridgeport, Conn., with headquarters at Monessen, Pa.

♦

W. Robert Timken has been appointed assistant to the president, Timken Roller Bearing Co., Canton, O. Since graduating from Harvard university in 1933, he has been active in the office and factory, serving in various capacities throughout the plant.

♦

H. T. Hamilton, who was the first office boy for Carnegie Bros. & Co., early predecessor of Carnegie-Illinois Steel Corp., retired June 1 as treasurer of Carnegie Natural Gas Co., after 52 years of continuous service with Carnegie companies. In 1892 when Carnegie Steel Co. was organized, Mr. Hamilton worked for L. C. Phipps, then the treasurer. Subsequently he became secretary for D. M. Clemson, general superintendent, and when the latter became president of Carnegie Natural Gas Co. and a director of Carnegie Steel Co., Mr. Hamilton was closely associated with him for 27 years. In 1921 Mr. Hamilton became assistant treasurer of the gas company and on May 1, 1938, was made treasurer and a director of the Carnegie Natural Gas Co. and the Apollo Gas Co., subsidiaries of the United States Steel Corp.

F. E. Vigor

R. R. Smith

R. G. Adair

♦

Charles R. Hook, president, American Rolling Mill Co., Middletown, O., was given the degree of doctor of commercial science by Oglethorpe university, Atlanta, Ga., at the university's twentieth annual graduation exercises May 28.

♦

Guido G. Behn, head of Hudson Motor Car Co.'s engineering department from 1910 to 1929, when he retired, has returned to the company as a member of the board of directors. In 1909 he joined as executive engineer the original group which founded the company.

♦

James A. Farrell, chairman, National Foreign Trade council, and former president, United States Steel Corp., has been presented the Captain Robert Dollar award for "distinguished contribution to the advancement of American foreign trade."

♦

Clarence E. Searle and Hobart C. Ramsey have been elected directors, Worthington Pump & Machinery Corp., Harrison, N. J. Mr. Searle, associated with Worthington since 1932, is vice president in charge of sales, while Mr. Ramsey, who joined the company in 1920, is in general administrative charge of operations.

♦

A. W. Lehman has been named manager of the advertising and sales promotion departments, Viking Air Conditioning Corp., Cleveland. He has had wide experience in advertising and sales promotion work with jobbers and dealers in his former associations with Willard Storage Battery Co. and Eaton Mfg. Co.

♦

Howard V. Searle, the past eight years sales representative in the New York metropolitan area for Federal Machine & Welder Co., Warren, O., has resigned. He is now representing the National Electric Welding Machines Co., Bay City, Mich., in the same area and is located at 30 Church street, New York.

♦

W. M. Nones, heretofore president, Norma-Hoffmann Bearings Corp., Stamford, Conn., has been elected chairman of the board. He has been succeeded as president by O. P. Wilson, formerly executive vice presi-

dent and treasurer. Mr. Wilson retains the position of treasurer. H. J. Ritter, secretary, has been made vice president and secretary, and C. B. Malone, vice president in charge of plant operations. E. C. Lennon, has been appointed assistant secretary and assistant treasurer, and J. J. Jenkins, auditor.

♦

C. C. Deck has been named superintendent, and H. F. Brier, assistant superintendent, Gary works rail mill, Carnegie-Illinois Steel Corp. Mr. Deck, who succeeds the late Grant Monk, has been with the corporation since 1919, when he began as a special electrician at Joliet works. In 1934 he was transferred to South works as a test engineer and March 16 was transferred to Gary as assistant superintendent, rail mill.

Mr. Brier, who succeeds Mr. Deck, began at Gary works in 1918. Since that time he has been employed as rail mill inspector, section inspector and operator and mill foreman. On Feb. 1 this year he was appointed general mill foreman, rail mill.

♦

W. E. Bittner, Diamond Alkali Co., has been elected president, Purchasing Agents Association of Pittsburgh. Other officers are: Vice president, L. M. Potter, Vanadium-Alloys Steel Co.; treasurer, E. C. Buerkle, National Bearing Metals Corp.; secretary, C. H. Rindfuss, Pittsburgh Screw & Bolt Corp.; national director, J. M. Knowles, Consolidation Coal Co. Inc.

♦

Thomas D. Jolly, director of purchases and chief engineer, Aluminum Co. of America, Pittsburgh, was elected president, National Association of Purchasing Agents at the group's twenty-fourth annual international convention in San Francisco recently. He is a former president, Purchasing Agents' Association of Pittsburgh, and last year served as national vice president of the sixth district and as a member of the association's executive committee.

♦

Dr. H. Jermain Creighton, since 1928 head of the chemistry department, Swarthmore college, Swarthmore, Pa., was elected president, Electrochemical society at its annual meeting in Columbus, O., recently. Other officers are: Vice presidents, D. A. Pritchard, Montreal, Canada; Alexander Lowy, Pittsburgh, and J. D. Edwards, New Kensington, Pa.; managers, C. E. Williams, Columbus, O.; K. G. Soderberg, Detroit, and J. A. Lee, New York; treasurer, Robert M. Burns, New York; secretary, Colin G. Fink, Columbia university, New York.

At the meeting, Dr. Francis Cowles Frary, director of research laboratories, Aluminum Co. of

C. C. Deck

America, was awarded the Edward Goodrich Acheson medal and $1000 prize. Dr. Frary is a past president of the society and is known for his achievements in the metallurgy of aluminum.

♦

I. A. Yost, formerly assistant manager of engineering, lighting division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed manager of engineering, lighting division. Division headquarters are at Edgewater park, Cleveland. Mr. Yost has been with Westinghouse since 1924. After completing the student's course, he was assigned to the illumination engineering section at the East Pittsburgh works; two years later was transferred to the lighting division, then located at South Bend, Ind., and when that division was moved to Cleveland in 1930 he was transferred there.

DIED:

■ KENNETH EASTON PORTER, Cleveland district sales manager, Pittsburgh Crucible Steel Co., May 24 in Cleveland. He was employed for a number of years in the railway sales division of Carnegie-Illinois Steel Corp., in Cincinnati, and later joined Ludlum Steel Co. He joined Pittsburgh Crucible in 1925.

♦

Frederick C. Hersee, president and general manager, Cambridge Screw Co., recently in Belmont, Mass.

♦

Charles B. D. Wood, 55, president, Pressed Steel Co., Wilkes-Barre, Pa., at his home in Kingstown, Pa., May 27. Mr. Wood founded the company in 1909.

♦

Alfred M. Pratt, 43, general supervisor, John Hassall Inc., Brooklyn, N. Y., maker of wire nails, in that city, May 28. He joined the company 13 years ago.

♦

Harry O'Connor, 72, retired superintendent, Anderson, Ind., plant of American Steel & Wire Co., in that city, recently.

♦

Everett Wesley Pike, 70, superintendent, Detroit Steel Casting Co., Detroit, May 24 in that city. He had been with the company 26 years.

♦

Virgil H. Hoagland, 64, a sales representative in Atlanta, Ga., for the Crucible Steel Co. of America, New York, in Atlanta recently. He formerly was with the Louisville and Nashville railroad.

♦

Arthur Cavanaugh O'Connor, industrialist, recently at his home in Grosse Pointe Farms, Mich. He was an organizer of the Hanna Furnace Co., Cleveland, and the Weatherproof Body Co., Corunna, Mich., and was a director, Michigan Wire Cloth Co.

♦

Gottleib Weil, 83, pioneer steel leader, May 23 at his home in Braddock, Pa. Going to Braddock in 1878, Mr. Weil started in the Edgar Thomson steelworks. At the time of his retirement in 1905 he was in charge of the converting department of the Edgar Thomson works.

♦

Philip J. Stremmel, 63, for many years associated with Granite City Steel Co., Granite City, Ill., in Bentonville, Ark., May 15. He joined the Granite Iron Rolling Mills in St. Louis, Granite City Steel's predecessor, as a scrap bundler, and was hot mill superintendent when he retired several years ago.

♦

Frank W. Tufts, since June, 1936, sales promotion manager, Continental Steel Corp., Kokomo, Ind., in that city, May 24. A graduate of the University of Michigan, at one time he was with Detroit Steel Products Co.; was assistant to the managing director in charge of market analysis, sales and advertising, General Motors New Zealand Ltd., Wellington, New Zealand; and also did retail sales development for Nash Motors Co.

♦

T. Morey Rude, 54, vice president, Bundy Tubing Co., Detroit, at his farm in Memphis, Mich., May 27. He joined the company in 1922 in a sales capacity, later becoming sales manager, and in 1933 vice president. Prior to his association with Bundy he was affiliated with the Weston-Mott Co., Flint, Mich., in production control work; purchasing agent with Remington Arms Inc., New York; and purchasing agent of the Scripps-Booth Co., Detroit.

Editorial

Senator Tydings Advises Wisely

■ EVERYONE in a responsible position in industry can benefit from a careful perusal of the address (p. 15) by Millard E. Tydings, United States senator from Maryland, before the forty-eighth general meeting of the American Iron and Steel institute. This is not because the senator told the leaders of the steel industry anything that they did not already know about what is wrong in this country's economics and about the remedies that are needed. It is because the senator, all through his speech, called upon industrial management to assist the millions of workers in this country to a knowledge as to what is necessary to provide more and better jobs for them.

"Let the 50,000,000 workers of this nation know, through information and education," pled the senator, "that theirs is the biggest stake of all in a revived business; that the present state of affairs demands that business in every form, big and little, should be encouraged, not discouraged; helped, not hindered; supported, not attacked; for with the coming of confidence and the revival of business there is work for the unemployed at good wages and steady hours, a better market and better prices for the farmer, a decrease in the governmental burden of taxation and a normal way of American life."

Co-operation Is Needed To Educate Worker on Benefits of Business Revival

Everyone likes to hear his own beliefs clothed in fine language and delivered by an able speaker. That fact undoubtedly had much to do with the full measure of applause with which Senator Tydings' address was received. For management in the steel industry knows that the bulk of the industrial income dollar is spent in wages. It knows that the bulk of the taxes are paid by the wage-earner. It fully believes that the present national administration is literally filled with men who "preach democracy and free enterprise while they set in motion the machinery to destroy it." It is keenly aware that the only road to recovery is through "the revival of the private business of the nation." It is fully in accord with Senator Tydings' 8-point program for putting the country on the road to better times.

Yes, the senator told the steel men what they already firmly believed. A fine speech, was the general comment. It remains to be seen, however, what the men who listened to the speech will do about its main feature, the senator's call for co-operation in educating the workingman and woman as to what a revival in business would mean in terms of more employment and security.

Day of Demagogic Political Claptrap Nears End; Factual Teaching Increases

Industrial management has learned a lot in the past few years about relating, in the public mind, its fortunes with those of the average individual. Many companies, large and small, have systems for informing their employes about all factors that affect volume of production, company income, wages, schedules of hours, dividends to stockholders and the like. Many of the annual reports to employes which have been set up in the past couple of years are notable for the wealth of information they convey to wage-earners. Manufacturers also are helping the cause along by speaking publicly, in increasing numbers, on how to improve the lot of the average individual.

For too long a time windy politicians and demagogues enjoyed a practical monopoly in molding public opinion. Accumulating evidence indicates that these gentry have over-stepped themselves in the opinion of the general public. The way is paved for a return to sanity. Industry can help vastly to that end by intensifying its campaign of education as to what is best for the people of this country.

The BUSINESS TREND

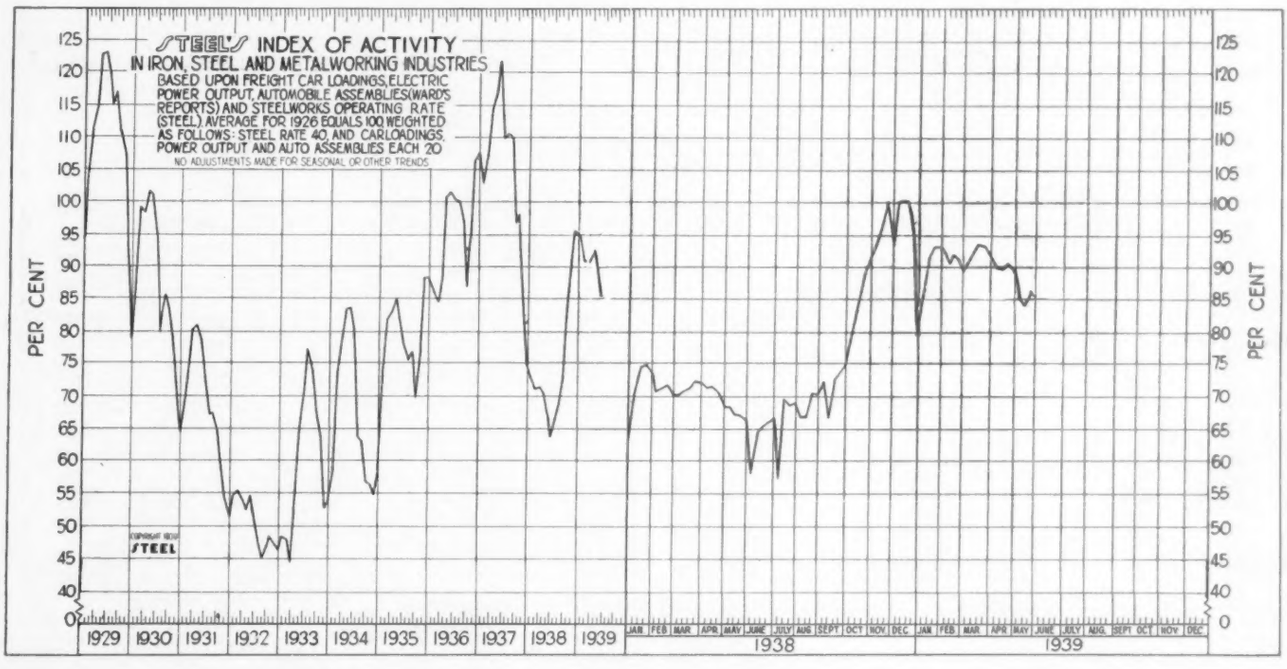
Decline in Auto Output Adversely Affects Index

■ REFLECTING the lower level of industrial activity throughout May, STEEL's index average for the month declined to 85.3. This represents a loss of 7.3 points from the high point this year of 92.6 recorded in March. The May average compares with 67.4 in the same month last year, but is 10.6 points below the 1938 peak of 95.9 recorded last November.

The sharp decline in automobile production during the week ended May 27 more than offset the gains recorded by the other three business indicators composing STEEL's index. As a result the index eased 1.4 points to 85.2, thus forfeiting most of the improvement registered in the preceding week. At this time last year the index stood at 66.5.

The decline in automobile production during the week ended May 27 to 67,740 units represents a new low so far this year. The sharp falling off in assemblies was attributed to the strike at Briggs which in turn crippled operations at the Chrysler plants, due to the lack of bodies. Output in the week ended June 3 will touch another new low for the year, reflecting the extended holiday shutdowns.

Steelmaking operations reversed the downward tendency of the preceding eight weeks to record a gain of 2.5 points to 48 per cent in the week ended May 27. A year ago the national steel rate was placed at 28.5 per cent from which point it receded further


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939

STEEL'S index of activity declined 1.4 points to 85.2 per cent in the week ended May 27:

Week ending	1939	1938
Mar. 11	92.7	70.8
Mar. 18	93.3	71.3
Mar. 25	93.2	72.4
April 1	92.2	72.0
April 8	90.0	71.3
April 15	89.7	71.4
April 22	90.4	70.8
April 29	89.2	68.4
May 6	85.1	68.5
May 13	84.2	67.2
May 20	86.6	67.1
May 27	85.2†	66.5

†Preliminary.

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	90.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	85.3	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	....	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	....	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

to 25.5 before the upswing got underway about the middle of June. Current indications seem to indicate that the low point in steelmaking operations this year was reached in the week ended May 20.

Revenue freight carloadings recorded little change in the week ended May 27, due in part to the abnormal improvement registered in the preceding week which resulted from the resumption of soft coal mining. Electric power consumption in the week ended May 27 regained most of the ground lost since the week ended April 1.

COMMODITY PRICES SLIGHTLY LOWER

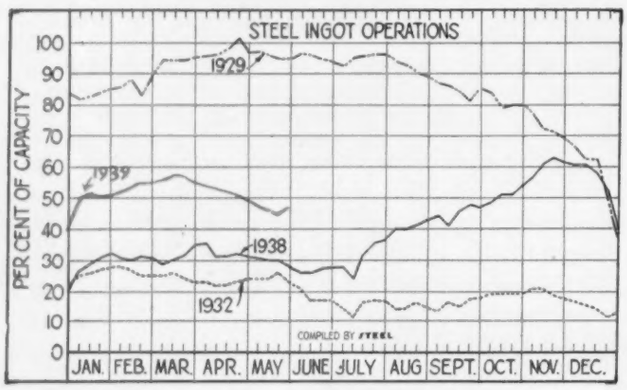
The all commodity wholesale price index of the United States Department of Labor eased 0.5 point to 76.2 during April. Excluding February, when the index remained unchanged, the latest decline represented the sixth consecutive month the index receded to lower levels. The April index figure is the lowest recorded since July, 1934. Early estimate for May indicates little variation from low levels prevailing through April.

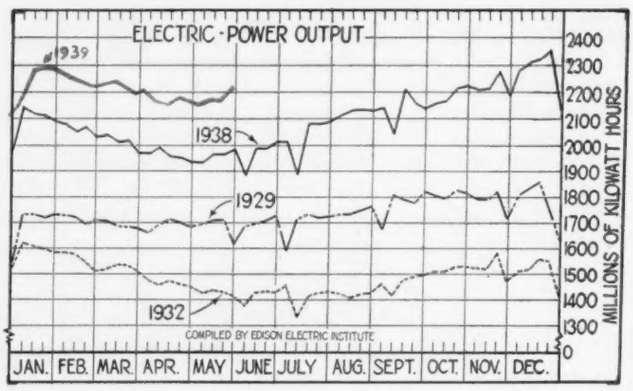
AUTOMOBILE OUTPUT DECLINED IN APRIL

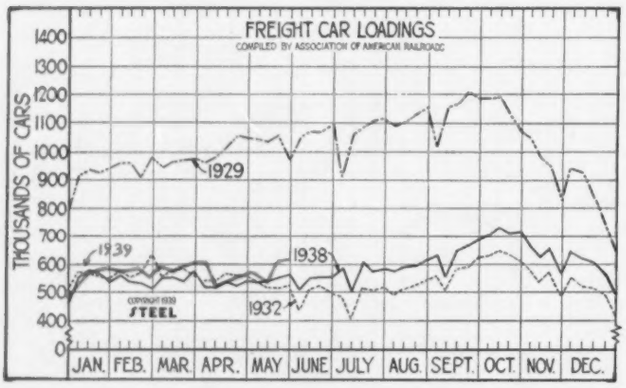
Production of automobiles including passenger cars and trucks in the United States and Canada, declined 35,226 units to 354,263 during April but remained 48.7 per cent above the 238,133 units assembled in the comparable months last year. A continuation of the downward tendency in automobile production during May is indicated in the estimated total output for the month of close to 300,000 units. In May last year assemblies totaled 210,183. Estimated retail sales of cars and trucks last month show a small gain over April of approximately 3 per cent, however, the increase over the corresponding month last year is substantially greater.

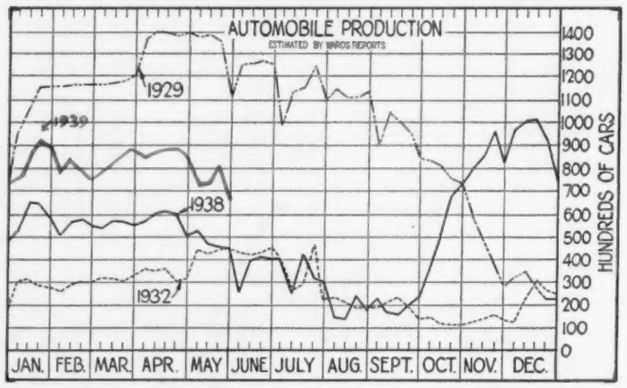
INDUSTRIAL PRODUCTION OFF DURING APRIL

Volume of industrial production declined sharply in April, as recorded by the Federal Reserve board's seasonally adjusted index. The decline in the index reflected chiefly the shutdowns at bituminous coal mines and reduction in activity at textile mills. Retail purchases by consumers remained unchanged. Factory employment showed little change during April, but pay rolls declined considerably reflecting fewer hours to work. The index of production declined 6 points to 92 per cent of the 1923-25 average, but remained well above the index figure of 77 recorded in April, 1938.



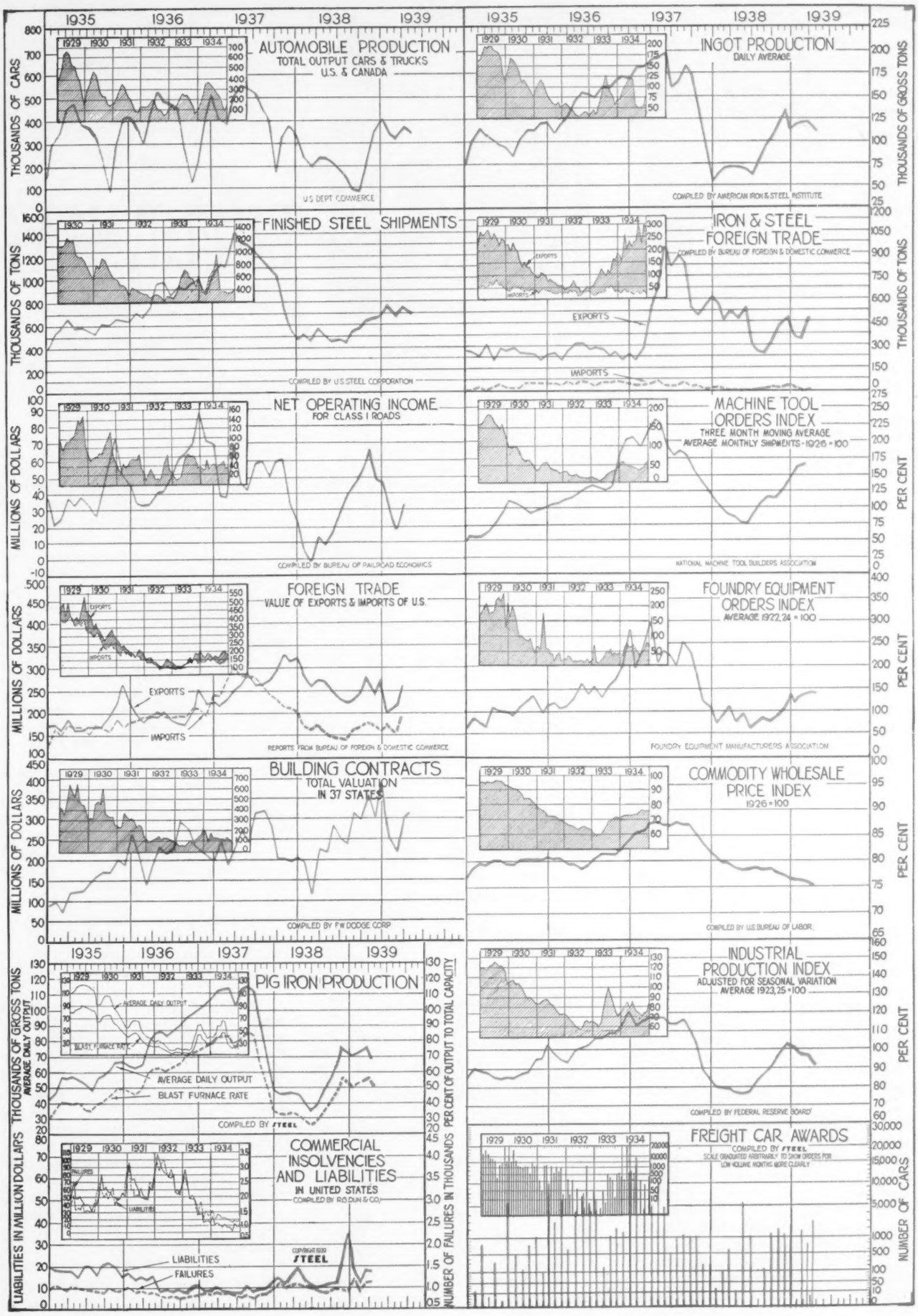




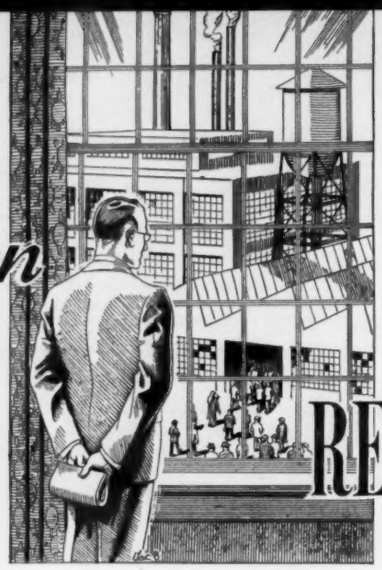


Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
Feb 4	53.0	31.0	28.5	85.0	2,287	2,082	1,588	1,728	577	564	575	947	79,410	51,443	27,110	116,000
Feb. 11	54.0	30.0	27.0	86.0	2,268	2,052	1,578	1,726	580	543	562	956	84,500	57,810	29,320	116,000
Feb. 18	55.0	31.0	25.0	88.0	2,249	2,059	1,545	1,718	580	536	572	958	79,860	59,100	30,410	116,500
Feb. 25	55.0	30.5	25.0	83.0	2,226	2,031	1,512	1,699	561	512	636	907	75,660	56,977	30,150	116,500
Mar. 4	56.0	29.5	25.0	89.5	2,244	2,036	1,519	1,707	599	553	560	977	78,705	54,440	31,390	116,500
Mar. 11	56.5	30.0	25.5	94.5	2,238	2,015	1,538	1,703	592	557	575	946	84,095	57,438	31,110	116,500
Mar. 18	56.5	32.0	24.5	94.5	2,225	2,018	1,537	1,687	594	540	585	958	86,725	57,558	30,590	117,000
Mar. 25	55.5	35.0	23.0	94.5	2,199	1,975	1,514	1,683	605	573	561	961	89,400	56,800	32,892	117,500
Apr. 1	54.5	36.0	23.0	95.0	1,210	1,979	1,480	1,680	604	523	545	967	85,980	57,500	35,756	120,000
Apr. 8	53.5	32.0	22.0	95.5	2,173	1,990	1,465	1,663	535	522	545	956	87,019	60,975	35,390	138,417
Apr. 15	51.5	32.0	22.0	96.0	2,171	1,958	1,480	1,697	548	538	567	972	88,050	62,021	35,778	140,822
Apr. 22	50.5	32.5	23.0	98.0	2,199	1,951	1,469	1,709	559	524	562	1,004	90,280	60,563	30,672	140,290
Apr. 29	49.0	32.0	24.0	101.0	2,183	1,939	1,445	1,700	586	543	554	1,052	86,640	50,755	31,121	139,732
May 6	49.0	31.0	24.0	97.0	2,164	1,939	1,429	1,688	573	536	534	1,050	71,420	53,385	43,899	140,672
May 13	47.0	30.0	24.0	97.0	2,171	1,968	1,436	1,698	555	542	517	1,048	72,375	47,415	42,587	138,541
May 20	45.5	30.0	25.5	96.0	2,170	1,968	1,435	1,704	616	546	516	1,046	80,145	46,810	43,470	139,528
May 27	48.0	28.5	23.0	95.0	2,205	1,973	1,425	1,705	617†	562	521	1,061	67,740	45,120	45,121	136,032

†Preliminary.


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
THOUSANDS OF CARS
THOUSANDS OF TONS
MILLIONS OF DOLLARS
THOUSANDS OF GROSS TONS
PER CENT
NUMBER OF CARS
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
PER CENT OF OUTPUT TO TOTAL CAPACITY

Forum on RE-EMPLOYMENT



■ Far from pessimistic despite his conviction that governmental policies have brought about a temporary lapse in individual courage and initiative, Walter B. Van Wart in this week's Forum makes a searching analysis of the current American frame-of-mind and contributing factors which hinder recovery.

Walter Van Wart is a Texan. He was born in Dallas in 1900 and attended the University of Texas, his college career being interrupted by the war. Having attained the rank of second lieutenant during the war, he began his industrial career in 1919 as shop helper in the Wyatt Metal & Boiler Works in Dallas. After eight years in the shop and two in the engineering department, he was appointed manager of the company's new plant in Houston. He was elected a director of the company in 1933, vice president in 1936 and since 1938 has been executive vice president.

"The American working man," says Mr. Van Wart, "interested as he is primarily in a job and in making a living, is apt to forget that if the profit system were destroyed in this country, his condition—instead of being better—would as a matter of fact become far worse. He does not realize that he would become a pawn of the government, to be assigned to jobs not of his own choosing but chosen merely to satisfy the immediate demands of the head of the state."

The Editors

■ Lasting business recovery and re-employment of unemployed employables in America, now totaling probably 11,000,000, is practically impossible until major changes have been made in our governmental policy. This is another way of saying that it cannot take place without a change in American public opinion.

Solution to the problem must be looked for not alone in the policies of the federal government but rather in the attitude of mind of the American people. Acts of the present national administration are not entirely responsible for present conditions. One needs only to review the acts of the 48 state governments to see clearly that the problem lies deeper than the policies of the national administration.

The belief is now held by a large section of the American people that social security—which they interpret to mean financial security—is to be desired above courage and enterprise developed by self-reliance. This condition has, I believe, become basic and fundamental. Until there is re-established in the minds of American people the opposite belief —that one's chances in life are better by the development of self-reliance—the present low state of business in America will continue.

The statement often is made that in this or that foreign country which has overturned the profit system, there are no labor troubles and no unemployment. There is a school of thought in America which, professing to be opposed to totalitarian states, would nevertheless have our Government take over a large number of functions which heretofore have been left to individual effort or to voluntary associations. Such believers contend that if the government should regulate more completely the activities of individuals, the future of the individual would be more secure. This group, though it may oppose a completely socialized state, would have us travel the road which inevitably would place us in the list of totalitarian states.

Compare American with Others

In arguing for this change in policy of our national government, these people leave out of consideration some vital facts. They fail to take into consideration the well-being of the American in comparison to citizens of other countries. They forget, for instance, that 70 per cent of the automobiles of the world are in the United States and that 40 per cent of the telephones are here. They fail to consider that in most of the foreign countries which they have in mind, three to four times as much labor is required to buy the necessities of life as is required of the laborer in America.

In Italy, for instance, a bricklayer or stone mason must work ten and a half hours to buy a basket of provisions. This same basket of provisions can be earned by a bricklayer or stone mason in the United States with labor of less than one and a half hours. This condition of well-being in America was not brought on by chance. It is the result of a definite public policy which we have maintained for 150 years.

The American working man, interested as he is primarily in a job

and in making a living, is apt to forget that if the profit system were destroyed in this country, his condition—instead of being better—would as a matter of fact become far worse. He does not realize that he would become a pawn of the government, to be assigned to jobs not of his own choosing but chosen merely to satisfy the immediate demands of the head of the state.

Therefore it seems to me that the first business in hand for thinking Americans is to work toward re-establishment in the minds of the American people of the idea that the profit system is their only salvation if they are to continue to enjoy the high standards of living.

Confidence was shaken in 1929 because of the collapse in October of that year. Since that time theorists have been able to convince a large body of the American people that it is necessary to junk much of our established system. In its place they would set up another in which the state would take over the problem of providing security for the future. They fail to realize that such ideas developed in totalitarian states destroy the profit system.

In attempting to provide security, recent governmental policies have destroyed confidence by restrictive tax laws, by regulating business and by a policy of unduly favoring organized labor. These policies have made private capital timid which in turn has stagnated business at a level little better than of the years immediately following the 1929 collapse.

If confidence is to be revived and long term business recovery promoted, punitive and incentive taxation policies should be abandoned. The Wagner labor act should be amended so as to place the employer on an equal footing with organized labor in labor disputes. Social security laws should be changed so as to provide a "pay-as-you-go" system. The total amount pledged to be paid out of this account should be gaged according to our national income. Deficit financing of the government should be stopped in an orderly fashion so as not too violently to disturb our equilibrium. For instance, appropriations for relief in the form of WPA allotments and other forms of "made work" should gradually be reduced and taken out of politics altogether.

Trim Expenses Gradually

Ordinary expenses of government should be trimmed by a policy of gradual reduction of expenses over a five-year period. Crop control legislation should be abandoned and payments to farmers should be reduced on a scale similar to the program in regard to reducing ordinary governmental expenses. After a period of years, the whole policy of

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Walter B. Van Wart
Executive Vice President
Wyatt Metal & Boiler Works
Dallas, Texas

"rigging prices" by the so-called parity payments, should be completely abandoned. Standing in the same category are laws for maintenance of price structures, such as the Robinson-Patman act and the Miller-Tydings act. These should be repealed.

I am convinced that if these steps are taken, business will show immediate improvement. At the same time I am convinced that we already have gone so far in our policies of subsidizing farmers and promoting public works at government expense, that we must work out of these conditions gradually.

Foreign Trade Is Declining

Another condition which has contributed materially to decline in business is the government's policy on foreign trade. America's foreign trade has been declining for the past 15 years. Average excess of exports over imports, not in gold and silver, in 1925 was $946,924,000. By 1930 this excess of exports had decreased to $743,845,000. Reports of the department of commerce show that in February of the current year exports failed to balance imports—if we except gold and silver. Total exports declined from $4,397,000,000 in 1925 to $2,455,000,000 in 1936. Recent releases of the department of commerce indicate that for 1939 exports will not exceed $2,000,000,000.

This situation is vitally affecting the South which formerly exported large quantities of cotton. It is estimated by competent authorities that in 1939 the country will export less than 4,000,000 bales of cotton. This will be the smallest amount exported since 1884, and is less than half of the average amount exported in 1925 and 1926.

These figures prove conclusively that if we are to re-establish full business recovery something must be done about foreign trade. We cannot continue to lose it at the rate it has been lost in the last 15 years, and hope to maintain a high degree of industrial activity. The Hull reciprocal trade treaties were well-meaning and did some good. They are totally inadequate, however, to meet this situation.

The whole tariff policy of the United States should be gone over by congress, with the idea of removing as many of the restrictions on trade as can be removed without lowering the standard of living of the American working man.

Revise Trade Laws

In this I am not advocating a policy of free trade. I am advocating only that all trade barriers—whether with foreign countries or within this country—should be removed, or at least lowered, to a point consistent with the highest development of our industries and the well-being of our wage-earners.

Foreign trade is not developed by a policy of withdrawing into our own trade territory and more than business recovery is promoted by "rabbits out of the hat" schemes. We must take a new hitch in our belts and go out into the markets of the world and get our share because we can do the job better than anybody else. To encourage business and industry to do this, restrictive trade laws must be modified in keeping with such a policy.

I am encouraged by the fact that certain signs already have appeared to indicate that America is making up her mind that "sleight of hand performances" will not take the place of courageous enterprise. For instance, more than one-fourth of our state legislatures recently adjourned without having added further to restrictive labor laws. In a few instances some of the worst abuses actually have been corrected. On one point only am I pessimistic. I am not certain but that the policy of applying "shots in the arm" has not been carried so far that we are going to have difficulty in shaking off the influence of the opiates.

Even though our national debt has reached an all-time high of over $40,000,000,000, I still believe that by pursuing a consistent policy of cutting expenditures, we not only can stop deficit financing of the government but also can in time make headway in paying off this debt.

The whole question before us is: "Are we willing to attack this problem in an orderly fashion—admitting that while it is very difficult it is not insolvable?" If and when we make up our mind on this point, all the other problems will have been solved and business activity will rise to such a point that all our employables will be back on productive work once more.

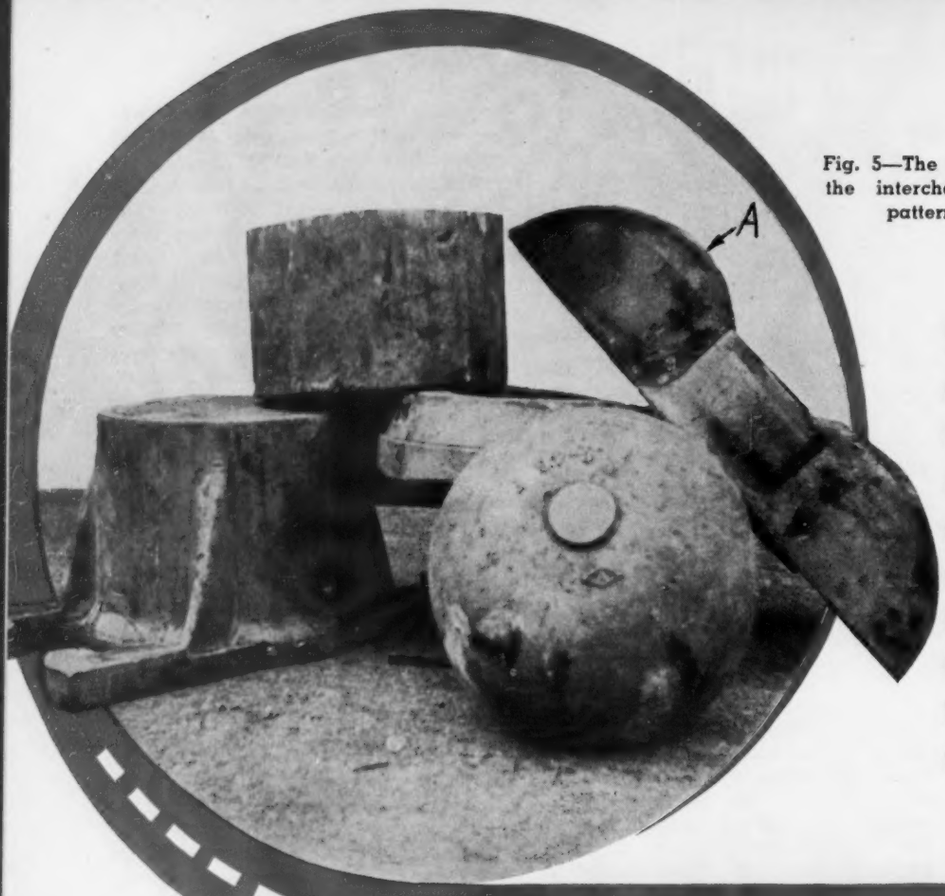


Fig. 5—The several pieces making up the interchangeable or combination pattern shown in Fig. 4

To obtain full advantage of the numerous possibilities of steel castings, the author points out how co-operation between buyer and seller is most essential if all factors involved are to receive due consideration. Examples are used to illustrate this viewpoint

Co-operation Between

By A. J. WESTPHAL*
Atlas Steel Casting Co.
Buffalo

■ "A PLACE for everything and everything in its place." This can sanely be applied to the use of steel castings. They have a definite place in industry.

Buyers want a good product, at a reasonable price, along with prompt service. Starting correctly is half the battle. This means that proper design for good foundry practice should be discussed; pattern equipment should be constructed for correct heading and gating to permit sufficient feeding so no shrinkage takes place in the casting sections; specifications should be discussed to determine best analysis for physical values required. Also other necessary details should be fully discussed.

Often steel-casting representatives meet purchasers who are using other parts where steel castings should be employed because the purchaser believes that they are more economical. Unless this issue is dealt with in a practical and understanding manner, no change will be made. In some instances no change should be made. In many others, a turn to steel castings will eventually save money for the buyer.

Co-operation Before Beginning

In one case the writer was asked to call at a shop where a machine was to be built and installed. It was to be a new design and the idea of the owner himself. After discussing the proposition it was sensed that someone with engineering ability would aid greatly and such a man in our organization was contacted. Then with the sales and operating representatives of the steel foundry and the prospective customer in a huddle, every detail was discussed. With this mutual co-operation, proper pattern equipment was constructed; the design was made as simple as possible to permit maximum machine efficiency; sections were reduced to a minimum sufficient to retain physical demands; some materials were put into alloys, and some parts changed to other materials. It developed into a serviceable machine for the customer, a sizeable order for the foundry and considerable savings for the buyer. Why? Well, because nothing was done until it had been thoroughly discussed by both parties. The steel castings proved their place. Today it is a real pleasure to visit this shop, to see the machine doing its job efficiently and to know it was largely because of mutual co-operation.

Steel Castings Save Money

It has been a common belief that steel castings are expensive compared to some other materials. Perhaps not enough thought is given to possibility of actually saving money by use of steel castings. Sections in steel castings can be decreased as against some other products and yet retain the physical characteristics. This tends to reduce the cost to the buyer.

As an example, a specific part on a machine had been constantly breaking and causing considerable loss of time to install new parts. The part was not a steel casting. Having been approached on the matter we

*Member Steel Founders' Society of America.

suggested the use of a steel casting. The buyer said he thought the cost would be prohibitive, but when it was mentioned sections could be considerably reduced in this instance and a change in design made at the spot where the part was breaking, an opportunity was given to prove the point.

Today as parts of this first material break, they are replaced with steel castings. Steel castings have proved more economical because they are not breaking. This cuts down replacement orders and saves labor of replacing the part, shown in Fig. 1. Breakage at point indicated with arrow was eliminated with slight modification and the warpage at section marked X stopped by proper heading, with no increase in metal.

In another case, because of trouble experienced with steel castings, the purchaser had soured on such products. Investigation by the foundry, with co-operation of the manufacturer, revealed improper pattern construction. Through reconstruction of the equipment to permit proper gating and heading, the shrinkage was eliminated and all was well again. Steel castings, the proper material for the required function of this part, had found their place again through the understanding of the buyer and the seller.

Specifications have much to do with the sale of steel castings. Such a matter comes to mind where an abrasive action took place and difficulty had been experienced with the steel castings. After the action was explained, another analysis was suggested and steel castings were retained with complete satisfaction.

Still another example of common understanding comes to mind. A certain intricate pressure casting, subjected to rigid test, was discussed thoroughly before any attempt was made to produce it. Through well-constructed pattern equipment made for practical heading and gating, the problem was mastered. The initial casting showed a defect, but by a simple alteration the balance of the order was filled satisfactorily. Fig. 2 shows the casting with risers (weight 1375 pounds) and Fig. 3 the cleaned casting (333 pounds).

On numerous occasions the customer has saved money on patterns by first approaching the foundry. In one case it developed that a combination or interchangeable pattern sufficed to handle four different designs. Consultation by both parties unearthed this possibility. Fig. 4 illustrates the cylinder in one of its several sizes. Through adding or removing loose barrel pieces (marked XX), the cylinder may be lengthened or shortened. Also by using loose pieces shown in Fig. 5, anchor feet, A, may be added or removed as required. Fig. 5 shows the several pieces making up the interchangeable, combination pattern equipment.

The point is simply this: Co-operation between purchaser and producer in first discussing the "nature of the beast" permits most difficulties to be eliminated before any work is done at all. By doing this, steel castings will justify their use and show they do have a definite place in progressive industry because their chemical and physical characteristics permit less weight and consequently a decrease in cost to buyer.

Buyers, Sellers of Steel Castings

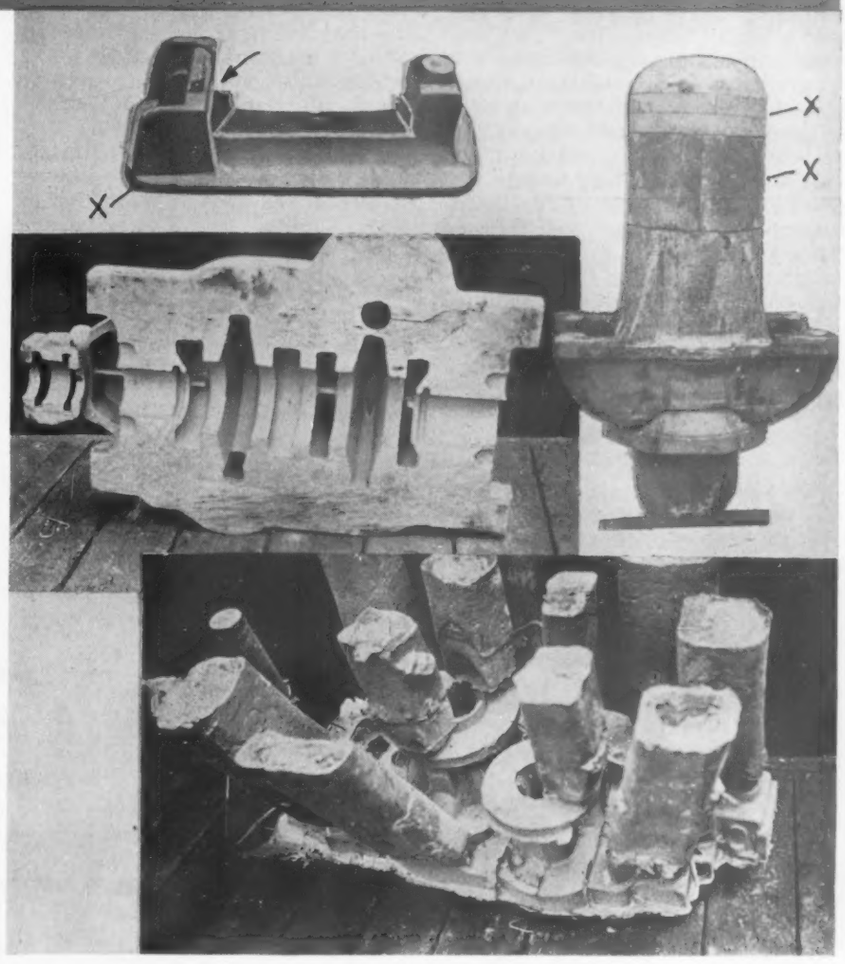
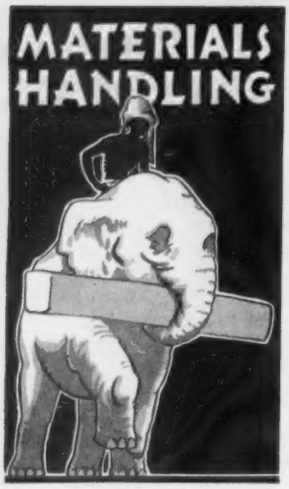


Fig. 1—This steel casting was used to replace original parts to solve a problem of breakage in a machine where cost of further replacements were eliminated. Time and installation expense saved were highly important here (top left)

Fig. 2—Proper arrangement of heading and gating as shown here made possible production of an intricate steel casting shown in Fig. 3 (bottom)

Fig. 3—Same casting as Fig. 2 but with heads and gates removed (center left)

Fig. 4—This combination or interchangeable pattern handles four different designs (top right)



Making Auto Parts

Exceptionally efficient production of a large number of small parts is made possible by careful layout of departments, use of high production continuous processing and conveying equipment, completely mechanized overhead handling systems. Large automatic plating setups also help

■ AT THE Guide Lamp division of General Motors Corp., Anderson, Ind., a complicated system of conveyors is utilized to handle efficiently a large volume of small parts consisting mainly of shells for headlights, tail lights, parking lights and similar automobile lamp assemblies, as well as bumpers, bumper guards and similar accessories.

Lamp shells in general follow an L-shaped path to the assembly lines. Reflectors and ornamental units follow a somewhat circular path on their way to the assembly lines.

Referring to the accompanying layout diagram of the plant, it will be seen that the northwest part is devoted to stamping and forming operations. Steel comes to this department in the form of sheets, is cut and blanked to size and fed into the stamping line. Stamping and forming operations on the large torpedo-shaped shells for head lamps are handled in five presses where in a series of progressive forming operations the extremly deep draw is produced necessary for this design.

Troughs Carry Shells

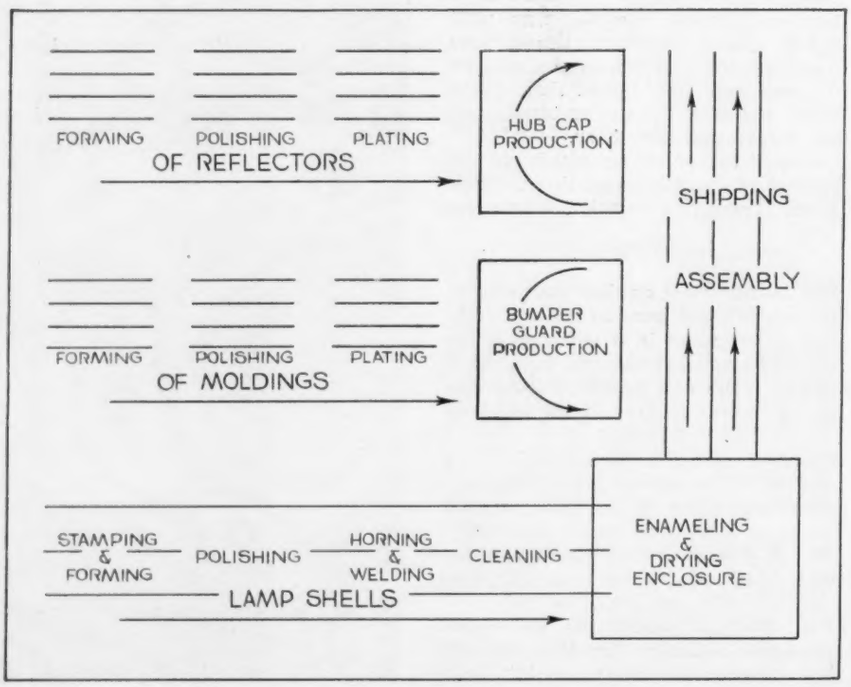
In this first group of presses the shells are carried from one press to the next by a series of troughs. Press operator upon removing the part simply places it on the trough which slopes toward the next press. Operator at that unit picks up the material, places it in his press, operates the machine and pushes the unit out of the back side where it slides down another trough to the next operator.

From this group of presses, the part proceeds to another line where work is handled from one stage to the next by a continuous belt conveyor with a dam in front of each work stage. Here additional forming operations finally produce the torpedo-shaped shell which is thoroughly cleaned and given a smooth surface preparatory to going through the finishing department. Parts proceed on overhead chain conveyor to the finishing department where the first operation is to give them a hot alkali wash. This is followed by a mild acid rinse, all on the chain conveyor. Parts then pass to drier on the same conveyor. The drying unit consists of an oven in which the temperature of 250 degres Fahr. is maintained.

From this conveyor the parts are racked on a rack-type conveyor which carries them through the actual painting operations. Racking and rack conveyor as well as all subsequent painting operations are carried on in a completely sealed unit, the air in which is carefully cleaned to prevent any dust or dirt from settling on the work.

Same Conveyor Returns Rejects

The overhead chain conveyor feeding the loading stage where parts are placed on the rack conveyor is so laid out that rejects are placed back on the same chain conveyor and taken back to the stamping and forming department for additional cleaning or other operations that may be required to prepare the unit for finishing. This same system is followed throughout the entire plant; that is, on each individual chain conveyor, and there are a large number of such units, provi-

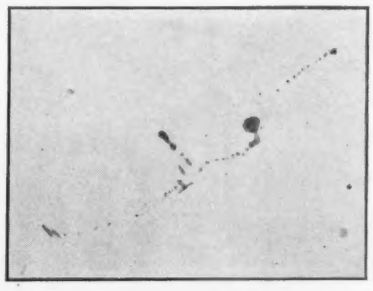


General layout of production lines at plant of Guide Lamp division of General Motors Corp., Anderson, Ind. Not complete or to scale

How Calcium-Silicon raises strength and ductility of Cast Steel

THE use of calcium-silicon with reduced amounts of aluminum instead of aluminum alone for deoxidizing cast steel in the ladle eliminates harmful chain-type, eutectic sulphide inclusions and thus raises the strength and ductility of the steel. The averaged values of a number of tests on .36 to .40 carbon steel showed that this treatment raised yield strength 7.15 per cent, tensile strength 6.49 per cent, elongation 2.52 per cent, and reduction of area 5.82 per cent.

Ask to have one of our metallurgists call and explain more fully how you can improve cast steel with calcium-silicon. He can help make your use of this and other "Electromet" ferro-alloys more profitable, without obligation. Electro Metallurgical Company, Unit of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York, N. Y. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

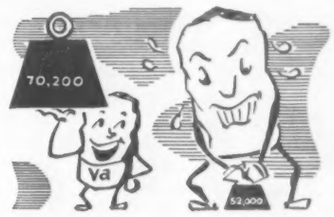


Harmful chain-type, eutectic sulphide inclusions segregated along grain boundaries in cast steel not treated with calcium-silicon. Magnification—500 diameters.

Inclusions in cast steel treated with calcium-silicon. The inclusions are dispersed and the steel has improved strength and ductility. Magnification —500 diameters. (Both micrographs slightly reduced in reproduction.)

Items of Interest about other "Electromet" Ferro-Alloys

Vanadium Increases Strength and Toughness of Medium-Manganese Steel Castings — The averaged values of a series of tests showed that the addition of 0.10 per cent vanadium to a medium-manganese steel raised the yield point from 52,000 to 70,200 lb. per sq. in., and increased the Izod impact from



20 to 58.7 ft.-lb. Tensile strength, elongation, and reduction of area were also slightly increased.

Use 3 Per Cent Chromium Steels for Wear-Resistant Castings — The 3 per cent chromium steels are easily hardened and relatively inexpensive. They are particularly suitable in service involving severe abrasion but little or no impact.

Zirconium Improves Machinability of Steel Castings — Zirconium in steel castings retards segregation of impurities at the grain boundaries, eliminates hard spots, reduces grain size and produces a cleaner and more uniform steel. As a result, machinability is greatly improved.

• • •

If you want more information about these and the many other "Electromet" ferro-alloys and metals and the service that goes with their purchase, write for the booklet, "Electromet Products and Service."

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sion is made so rejects can be placed on the same conveyor and taken back to the loading point for correction.

Lamp shells after being loaded on the rack conveyor are given first a prime coat of black. This material is heavily pigmented for color and protection of the metal. The enamel is applied by dipping the parts in a large tank.

Excess Enamel Drained

Rack conveyors, after lifting the units from the tank, proceed over a drip pan where excess enamel is allowed to flow off. Parts are given a bake at temperature of 410 degrees Fahr. for 45 minutes.

The second coat of enamel is applied while parts are still on the rack conveyor by dipping in a second tank of enamel especially formulated to give a high gloss and luster. This coat also is baked at 410 degrees Fahr. for 45 minutes. The bake ovens utilize indirectly heated air and include complete automatic temperature control.

A unique feature of this equipment includes special provision for handling the paint tanks. These tanks, each approximately 12 feet long, 4 feet wide and 3 feet deep, are mounted on wheels. Rails extend underneath the rack conveyor line so a full tank can be placed easily in position for the dipping operations. When empty, the tank is pulled out from under the line, passes through a turntable which takes it to a part of the finishing room where it can be refilled. In the meantime, a full tank has been moved to the turntable and placed underneath the rack conveyor line. This arrangement of rails, turntables and switches enables a tank to be shifted completely in 15 to 20 minutes, thus providing minimum interruption to production.

Each tank is complete with filters and a motor-driven agitator. Also each tank is heated with steam so the enamel is maintained at a temperature between 88 and 90 degrees.

As will be seen from the accompanying layout diagram, parts have proceeded from the stamping and forming department in approximately a straight line through the cleaning operations to the rack conveyor. They continue on a straight line through this conveyor to the unloading stage at the far end. From here the parts are placed on overhead chain conveyors which carry them to the assembly department at right angles to the direction of motion all parts have been traveling. Of course there are different lines for different parts but the general flow of material is as outlined.

Bumper Guards Stamped

Bumper guards, also produced in this plant, are stamped from heavy steel stock in coils and travel roughly in a semicircular path through this department as indicated in the layout diagram. Bumper guards are blanked and then passed to the first forming operation. Some designs require a second forming operation before the anchor plate is welded into the back of the guard. This anchor plate has also been blanked and formed from heavy stock and a staking bolt placed through it. This bolt has square body which fits in the square hole formed in the anchor plate.

After polishing and inspection the bumper guards pass to the copper plating line. After copper plating comes application of nickel plate, then nickel color and finally chromium plating. This is followed by inspection and paint embossing. Paint is then baked at 275 degrees Fahr. for about 30 minutes, inside given a lacquered coat, followed by an aluminum body coat, inspection and then packing for shipment.

Handling for all these operations is highly mechanized, individual chain conveyors being used between processing points and to final packing areas.

Condensed Water Avoids Stains

An interesting feature of the plating operations where rinsing is so important is the use of condensed water from the steam system to avoid water stains on the work.

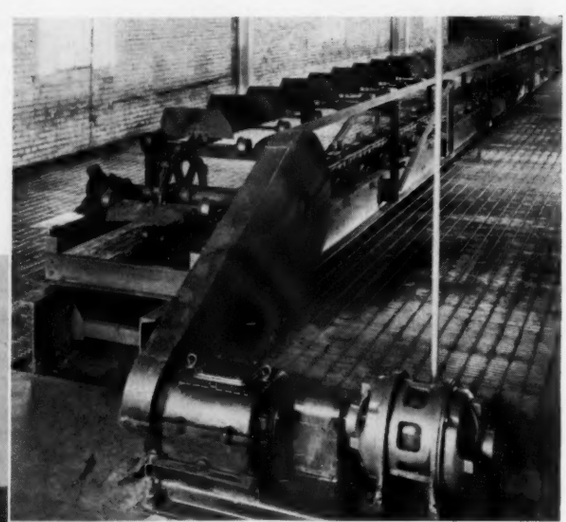
The automatic unit nickel plating bumper guards handles 1200 to 1800 pieces per hour plating about 1200 square feet area per hour and employing current of 20,000 amperes. A second unit also is available which has a production of 800 pieces per hour. Both of these units are entirely automatic in operation from the loading of the work on the line to the unloading of completed parts. The automatic chromium plating line can handle 2200 bumper guards per hour, the output of both nickel plating units.

Nickel and chromium plating of

(*Please turn to Page* 76)

Inclined Elevator Expedites Coal Handling

■ **At the new power plant (below) of Industrial Rayon Corp., Painesville, O., coal is stored in piles by a Link-Belt steam locomotive-crane. Coal is brought to bottom of inclined elevator which runs to flight conveyor over bunkers**



This pusher-type conveyor (above) receives coal from inclined elevator and distributes it to bunker doors. Photo courtesy Link-Belt Co., Chicago

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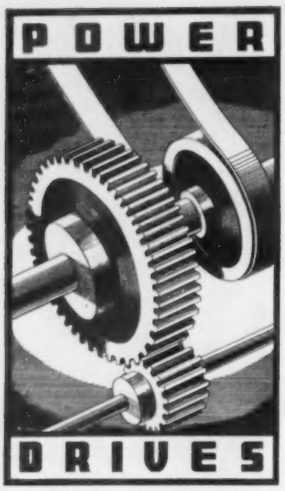


Dry, Boundary Friction

Many factors influence the coefficient of friction of a material. Results of recent tests on many materials may guide design and application engineers in sound interpretation of published data

By L. M. TICHVINSKY
Reserach Engineer
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Drive engineers, continually confronted with friction problems, find scarce information for selecting data on coefficient of friction in most handbooks. Usually some kind of commonsense interpolation must be made to allow for the particular service conditions at hand. The accompanying data may prove valuable in such instances.

■ THREE KINDS of friction are encountered in engineering practice: dry, boundary, and fluid friction. The first two types are as important as the latter, but only limited information is available due mainly to testing difficulties and the great number of variables entering into friction phenomena.

Thus the engineer using published data on friction must know exactly under which test conditions these data were obtained. If these conditions simulate his application, then the use of these data may prove to be satisfactory. If test and performance conditions are not similar, however, the respective figures for the coefficient of friction might be off by more than 100 per cent.

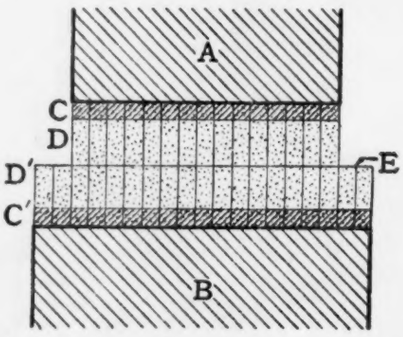
Elevator Motor Bearing Studied

This fact is illustrated by this example in which values of all three kinds of friction were recorded on the same unit under different conditions, of course: Coefficient of friction of an elevator motor bearing where starting was measured after various rest intervals. Table I shows the data. The bearing was 6 inches in diameter and 8 inches long. The load was equal to 300 pounds per square inch. Oil used had a viscosity of 200 seconds Saybolt at 100 degrees Fahr. and 46 at 210 degrees Fahr.

Early experiments indicated the friction of bodies was independent of the area of contact and was proportional to the normal load. This means that the coefficient of friction does not depend on the unit pressure between the surfaces in contact. Later it was observed that in practical cases the coefficient of friction is independent of the velocity of relative motion between the rubbing surfaces. Experiments have confirmed the first conclusion, but there is quite a discrepancy between conclusions regarding the effect of velocity.

Thus investigators in 1925 found that friction did not change over a velocity range from 45 feet per minute to 120 feet per minute. On the other hand, measurements of the braking action of cast - iron blocks on hard steel tires indicate that friction decreases as the speed increases.

Fig. 1—This shows adsorption layers in boundary friction. A, B are metal surfaces. C, D, C′, D′ are molecular layers. E is the sliding plane. C, C′ are active parts of molecules. D, D′ represents less active parts of molecules



The physical phenomena taking place under conditions of dry friction have not as yet been thoroughly elucidated. It is assumed that the causes of dry friction are dual mechanical interlocking and attraction between surface molecules. The mechanical interlocking theory well explains the high value of the coefficient of friction with rough surfaces and light loads. Johansson gages with finely polished surfaces serve as an example of the second theory of dry friction. Here attraction between surface molecules becomes so great that large forces must be applied to separate the blocks.

Dry Friction Experiments

Tests on dry friction were made with a machine consisting essentially of an accurately balanced flywheel disc set rotating freely and then decelerated by the friction of stationary spherical rubbing contacts lowered onto it. Some of the results, mentioned here in brief, are extremely interesting.

Effect of Load. With carefully cleaned surfaces, coefficient of friction was independent of the load within the limits of experimental error. Table II shows this.

Effect of Velocity. Any change in friction with change in velocity can be detected by an alteration in the slope of the deceleration curve. If the slope of this curve remains constant it indicates a constant coefficient of friction. Thus, with clean surfaces it was always found that the friction was constant from the high velocity at the beginning of the experiment down to the smallest velocity at which it could be measured accurately (one revolution per second). The coefficient of friction was constant between

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Table I—Three Kinds of Friction Recorded on the Same Unit

Coefficient of Friction—f	Rest intervals after which measurements were taken	Type of friction
0.1085	15 seconds	
0.114	30 seconds	
0.119	1 minute	Boundary or semi-fluid
0.129	3 minutes	
0.129	5 minutes	
0.131	10 minutes	
0.146	18 hours	Transition from semi-fluid to dry
0.152	44 hours	
0.003	Running at average speed of 100 feet per minute	Fluid
0.004		

Table II—Effect of Load on the Coefficient of Friction for Different Materials

Load	Glass on Glass	Mild Steel on Mild Steel	Hard Steel on Hard Steel	Nickel on Mild Steel	Carbon on Glass	Garnet on Mild Steel
Gm	f	f	f	f	f	f
10.8	0.41	0.56	0.41	...	...	0.39
22.3	0.39	..	0.41	0.61	0.18	0.38
38.5	0.40	0.59	0.46	...	...	...
63.8	...	...	0.42	...	...	...
95.9	...	...	..	0.68	0.18	...

The coefficient of friction f is independent of load for clean surfaces over the range of loading used in these experiments. Final washing was done with pure alcohol and the surfaces were heated to 150°C. in an air oven to remove films of moisture or alcohol.

Table III—Effect of Finish on the Coefficient of Friction when Cadmium Contacts were Used

Disc Material	Surface	Coefficient of Friction f
Steel	Polished	0.449
	Ground with fine emery	0.552
Glass	Polished	0.309
	Ground with fine emery	0.457

rubbing speeds of 600 and 60 centimeters per second.

Contact Area. Prolonged running of the apparatus caused abrasion and flattening of the spherical surfaces so area of contact between the surfaces was greatly increased. There was, however, no change in friction. With glass contacts rubbing on a glass surface, this abrasion was quite marked, and the area of contact increased from a point to four square millimeters after a few minutes running.

Surface Finish. Data in Table III show how the grade of finish of the disc surface affected the friction where cadmium contacts were used.

Dissimilar Surfaces. When dissimilar surfaces were used, the coefficient of friction depended upon which material composed the rubbing contact, as shown in Table IV for combinations of nickel, mild steel and glass.

This effect is most marked with nickel and steel. Where nickel contacts on steel gave a friction coefficient of 0.66, steel contacts on nickel gave 0.49. One figure is seen to be higher and one lower than for either nickel on nickel or steel on steel. It may be noted that for each of the three combinations, one figure for dissimilar surfaces was greater than either of those for similar surfaces. The higher one was obtained when the rubbing contacts were made from softer material.

An examination of Table V shows there is no systematic variation of friction with surface hardness. However, when contacts were made from a soft material (carbon), the order of increase of friction was from hard to soft bearing surface. When extremely hard contacts (garnet) were used, the order was reversed. Carbon contacts did not abrade any surfaces, whereas garnet scratched all the surfaces with scarcely any abrasion to itself.

Various Atmospheres. Microscopic surfaces examination showed continuous abrasion occurred, so a fresh rubbing surface was always being exposed. In air, this fresh surface would be covered rapidly by an absorbed film of oxygen or oxide. If frictional effects were confined to this surface layer, it might be expected that friction would be influenced by the nature of the film. Measurements of friction were carried out in air, nitrogen, oxygen and carbon dioxide to see if any such effects could be detected. The results in Table VI show the friction coefficient is the same, within the limits of experimental error.

Table IV—Effect of Dissimilar Materials on Friction

Rubbing Contact	Disc Surface Nickel—f	Mild Steel—f	Glass—f
Nickel	0.53	0.66	0.56
Mild steel	0.49	0.57	0.61
Glass	0.50	0.51	0.40

Table V—Effect of Hardness on Friction

Rubbing Contact	Disc Surface Nickel—f	Mild Steel—f	Glass—f
Hard steel	...	0.415	0.53
Aluminum	...	0.47	...
Copper-cadmium	...	0.32	...
Magnesium	.	0.42	0.42
Cadmium	...	0.46	0.30
Copper	0.49	0.36	0.53
Ebonite	...	...	0.53
Carbon	0.24	0.21	0.18
Garnet	0.37	0.39	0.45

Table VI—Effect of Atmosphere on Friction

Gas	Contacts	Disc Surface	f
Air	Mild Steel	Mild Steel	0.57
Nitrogen	Mild Steel	Mild Steel	0.57
Oxygen	Mild Steel	Mild Steel	0.58
Carbon dioxide	Mild Steel	Mild Steel	0.57

Friction Below Surface

This test indicates frictional effects are not confined to the first molecular layers but extend below to cause distortion and abrasion to some depth within the metal.

These tests show, then, that within the limits of experimental error friction is independent of the load (1 to 25 grams), of the apparent contact area ("point contact" to several square millimeters), and of the velocity (from 600 to 60 centimeters per second). Contaminating films on the surface can give apparent deviations from these relationships. There is no systematic relationship between surface hardness and coefficient of friction. Apparently the frictional effect is not confined to the surface layer of the metal but causes distortion and abrasion below it.

A figure of 0.2 or more for the coefficient of friction indicates that the friction takes place in the dry region.

Boundary friction has been suggested as a term to denote all cases of frictional resistance between solid surfaces fully or partially separated by a thin film of fluid, the thickness of which may be meas-

ured in terms of molecules. The unknown reactions between the molecules of the fluid and of the surfaces determine the nature of the frictional resistance.

Most experiments on boundary or semifluid friction reveal that it depends on a number of factors such as adsorption, adhesion and orientation of molecules. Apparently adsorption plays the predominant role. The mechanism of lubrication becomes possible as a result of the physical property of the lubricating substance to adhere to the moving surfaces.

Lubricant Molecules in Layers

On two such surfaces, continuous adsorption layers are formed by molecules of lubricants that cling by their more active ends to the metallic surfaces, shown schematically in Fig. 1. Relative motion takes place on the sliding plane E where the molecules meet with their less active parts and cause the frictional resistance to decrease considerably. The magnitude of forces which attract the active parts of molecules to the metal surfaces depends on the chemical properties of the lubricant and the kind and type of bearing surface.

For most organic compounds—to which all lubricants belong—the adhering force to such metals as steel and bronze is extremely high. In virtue of their magnitude some physicists consider the adsorption layers quite tenacious and firmly attached and welded to the metal. According to the experiments at the laboratory of Physical Chemistry in Cambridge the value of the coefficient of friction in the boundary region is independent of velocity and area of contact. These experiments indicate that for some class of lubricants and surfaces the coefficient of friction is approximately independent of load. The dependence of the coefficient of friction upon the load for some other class of lubricants and surfaces cannot be correlated according to the viscosity of the lubricant or the polarity of its molecules.

A friction coefficient from 0.01 to 0.1 indicates that the friction takes place in the boundary region.

♦

Oil Well Casings

■ A complete range of oil well casing of A.P.I. standard sizes down to 5½-inch outside diameter, with wall thicknesses to meet practically any service, is announced by A. O. Smith Corp., Milwaukee. These casings are made from rolled steel plates in four grades and have minimum yield point of 105,000 pounds per square inch. Lengths average 50 feet.

Thermal Bonding Of Motor Parts

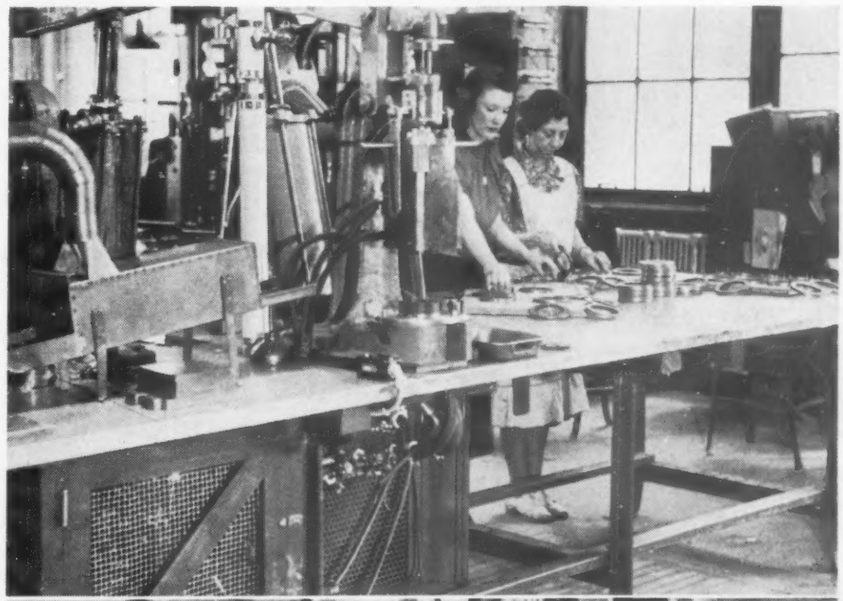
■ A NEW USE for high frequency induction furnaces at the plant of RCA Victor Co., Camden, N. J., is the heating of Victrola motor laminations for melting thermoplastic cement while laminations are under pressure so that they can be permanently bonded without the use of rivets.

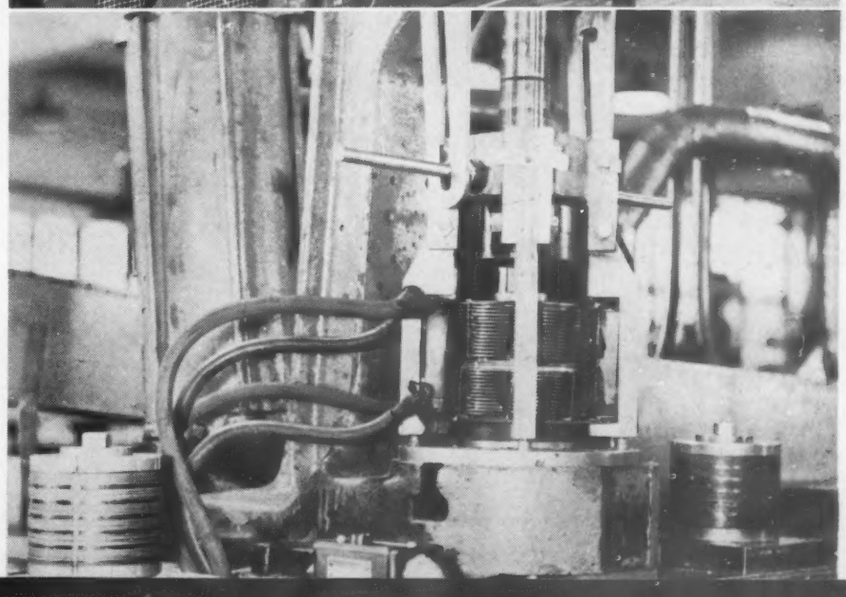
Motors produced by this method are said to be quieter, more compact and show a large saving in both material and labor. Motors made with riveted laminations varied in quality due to the slipping of these laminations during the riveting operation. More transformer iron had to be used because of the electrical losses caused by the rivets. With the new method greater accuracy of alignment is attained, and the "once around" noises are reduced considerably. Production has been pushed to over 6000 laminated rotors or stators per day. Diameter of the motor has been reduced 1 inch from that of the old riveted design. Area is 30 per cent less and weight has been lowered 48 per cent.

Equipment used for the bonding operation consists of two standard 3-kilowatt high frequency converters and two coils, all built by Ajax Electrothermic Corp., Trenton, N. J. Lamination assemblies are placed in the furnace coil in stacks, and a complete stack is heated to fusion temperature and pressed in less than 3 minutes. Assemblies are bolted together and removed from the furnace under pressure of the bolt and are placed in an air cooling chamber. After removal from this chamber the bolt is taken out and assemblies are ready for use in the motors.

(Upper) Assembling laminations before placing them in combination furnace and press shown at center. Air cooling chamber is seen at left, and high frequency converter is located under the table

(Lower) Motor laminations in place before lowering of pressure head. At left is shown a rotor after the heating and pressing operation. Bolt holds stack firmly until after cooling is completed





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REDUCES POWER BILLS

Improve power factor . . . Reduce amount of current line must carry between capacitor and source of power . . . Reduce line drop and effect better line regulation.

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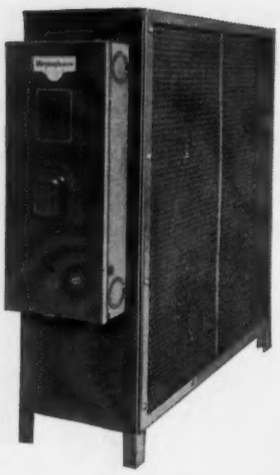

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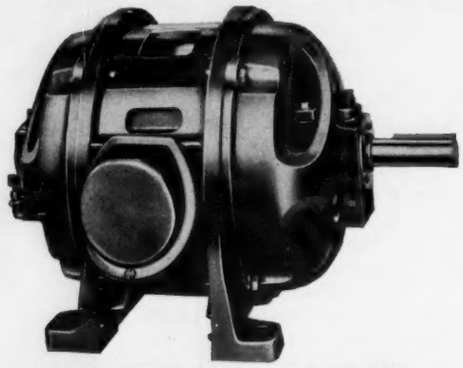

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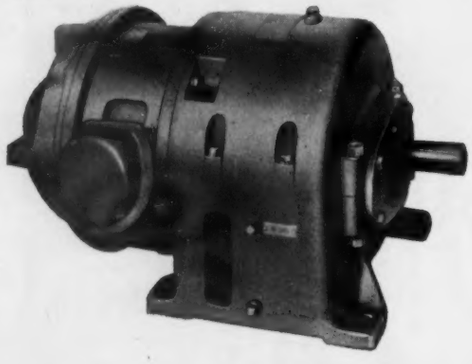

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Saves wiring, conduit and labor . . . Costs less to install . . . Gives magnetic starting, overload protection, manual disconnect switch and Nofuze Circuit protection.

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W WESTINGHOUSE ELECTRIC

Westinghouse

For new Boiler and Steam Drive - $30,000.00

For 12 Westinghouse Gearmotors - $6,744.00

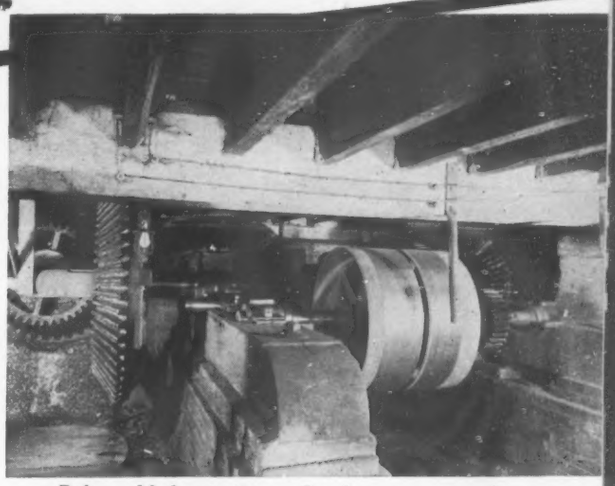
Savings - $23,256.00

SNUFF COMPANY MODERNIZES PLANT... GAINS IN EFFICIENCY AND FLEXIBILITY

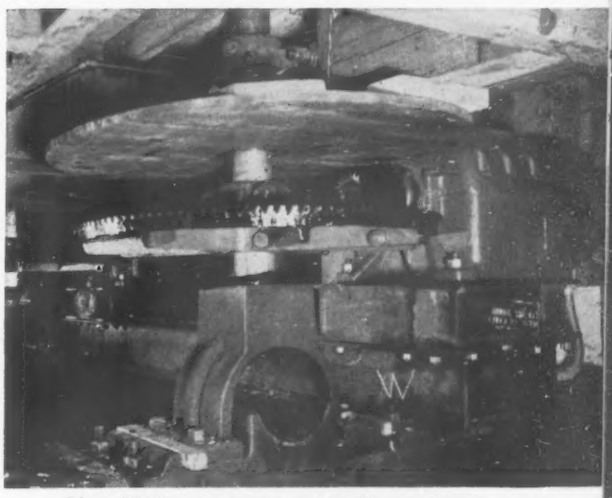
A leading American snuff manufacturer was confronted with the necessity of rehabilitating steam power equipment. A new boiler, steam engines and lineshaft drives would cost about $30,000.00. A Westinghouse gearing expert pointed out that 12 gearmotors, in place of a complete new drive, not only would permit utilizing the existing gears, but would save the company more than $23,256.00 in capital investment. While operating costs are comparable, the gearmotors offer the additional advantage of flexibility. As a result, the company operates only the grinders needed to meet production instead of all of them as under the former system.

In every phase of industry, manufacturing engineers and management are effecting savings and like efficiency through the greater flexibility by use of Westinghouse motors and control. Perhaps your plan of modernization could use this unique Westinghouse service. If you are interested, simply write the nearest Westinghouse office or correspond direct with Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Department 7-N.

J-90191

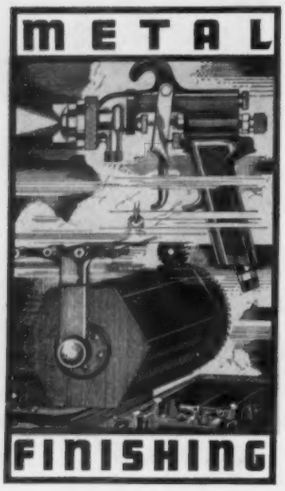


Before Modernization — Ponderous gears, heavy lineshaft, and huge belt pulleys operated these snuff mills. In case of trouble, the entire line had to be shut down.



After Modernization — twelve Westinghouse gearmotors, providing exact speed and horsepower for the driven load — at one-fifth the cost.

Motors and Control



Spray-Gun Motion Study

Paying attention to a few, simple, underlying rules of motion study and spray-gun technique offers possibilities of greatly increased production with less fatigue and improved quality of work, as an authority here points out

By B. C. GARDNER
The DeVilbiss Co.
Toledo, O.

■ THERE IS an excellent opportuntiy for motion-study analysis in connection with use of spray guns to determine the most efficient methods of painting any particular project. Of course, the same system that would be used on one item may not be at all suitable for most efficient application of paint to another item. However, where mass production finishing methods involve the use of a spray gun, a detailed study of spraying technique for each type of item handled will usually be found an extremely paying proposition.

Study Flat Surface Spraying

Possibly one of the most elementary factors that should be understood thoroughly at the outset is the most efficient method of spraying a flat surface. Figs 1 and 2 illustrate the two most important things to watch. The proper method of making a spray gun stroke is to avoid swinging the spray gun in an arc. The arc method is wrong because too much paint is applied at the center of the stroke and too little at the extreme ends. Also, the distance between the gun and the work may vary almost on a ratio of 2 to 1. Waste due to excess vapor, of course, results. Center of stroke is wet while ends are dry and frosty.

Under such conditions it is easily seen why it is extremely difficult, if not almost impossible, to apply a uniform layer of paint. The correct procedure is to hold the gun at right angles to the surface at all times and to trigger the gun at each end of the stroke; that is, begin the stroke, then pull the trigger. At the end of the stroke, release the trigger before the stroke is completed.

The reason some operators do not trigger the gun as suggested is quite simple. Instead of cutting down the fluid flow by adjusting it either at the pressure feed tank or at the fluid regulator, they make the mistake of adjusting it by means of the fluid adjusting screw on the spray gun. Turning this adjusting screw inward to reduce the material flow increases the spring tension on the trigger. Naturally, it becomes extremely difficult to pull and tires the operator's hand after a short period of time. This results in a tendency not to trigger the gun properly. This difficulty can be eliminated by permitting the fluid adjusting screw on the spray gun to be left wide open. Then, in practically all cases, the necessary adjustment can be made at the pressure feed tank or at the fluid regulator.

If this plan is followed, the user will find that less material will be consumed, there will be less fatigue for the operator, there will be reduced wear on the spray gun parts such as tips and needles, and an improved finish will be obtained.

The second important factor is to hold the spray gun at all times perpendicular to the surface being painted. Fig. 2 illustrates by solid lines the correct position in which the spray gun should be held. Dotted lines indicate an incorrect position. Most satisfactory results will be obtained when the spray gun is held some 6 to 10 inches away from the surface.

Figs 3 and 4 will serve to indicate correct and incorrect methods of spraying corners. As will be seen in Fig. 3, when the spray gun is operated up to and past the corner in painting one side, a certain amount

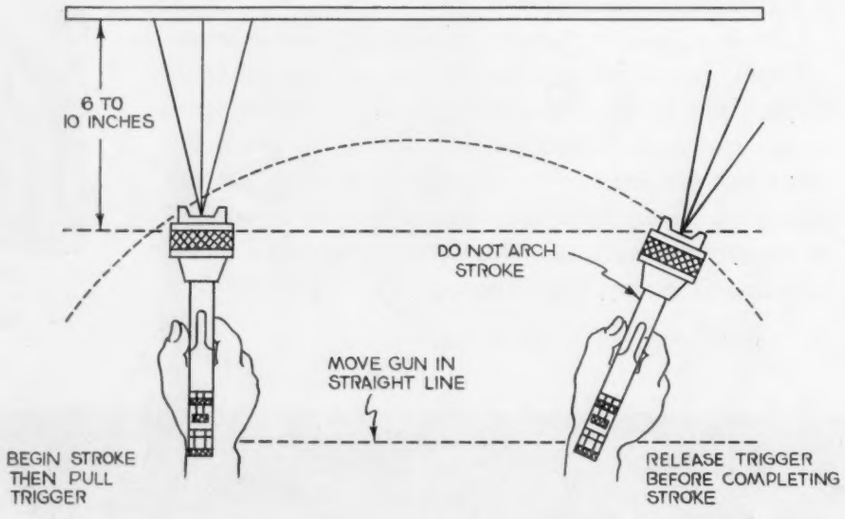


Fig. 1—Showing proper method of making a spray gun stroke. Gun is triggered at both start and end of stroke. Stroke is not arched but gun moves on straight line

DIRTY WORK
IN THE MACHINE SHOP

Black, messy oil was driving them crazy at this plant . . .

A SCREW MACHINE products plant in an Eastern state had an unhappy crowd of operators on their hands. The management wasn't too happy, either. Messy, evil-smelling cutting oil was making inspection of work difficult and operation of the machines unpleasant. The oil in use also had a tendency to separate when machines were left idle for a short time.

Shell was asked to try its hand at the problem. Working with the plant engineers, the Shell man began a careful survey of the threading machines, and the single- and multiple-screw machines.

After a series of experiments, he made his recommendation: the proper type and grade of Shell Cutting Oil to meet the problems in this plant.

Two years have passed since the Shell man made his recommendation and the oil was installed. Here, in plain words, is the record reported by the plant:

1. The oil is completely clean and odorless—inspection is easier and operators are well satisfied.

2. Finishes are considerably better than before.

3. Tool life has been increased and "down time" has been decreased, resulting in a greater net production.

4. In cutting brass, there is no discoloration of work as had sometimes happened before.

Here is a record--pure and simple—of a job accomplished by Shell for a manufacturer. Its importance lies in the fact that it is being repeated day after day in plants all over the country. Shell men working with Shell products can often save you dollars in maintenance —make production more efficient and profitable. Why not let a Shell man help *you?* There is a Shell office near you.

SHELL

SHELL CUTTING OILS

of spray is sure to be deposited around the corner. Then when the other side is sprayed, there will be over-spray around the corners on both surfaces. To prevent this, it is recommended that the sides be painted up to within 3 or 4 inches of the corners as shown in Fig. 4. Then, by holding the spray gun at an angle with the corner, it can be raised and lowered to catch both sides of the corner simultaneously. This would apply to cabinets, cases, etc. which are finished in an assembled state.

Plan Gun Movements

In painting any particular assembly, the most efficient combination of spray gun movements to produce the desired coverage should be worked out carefully and not left to the individual operator's discretion. Someone familiar with motion study, working in close cooperation with a man in the finishing department who is thoroughly familiar with spray gun technique, may possibly produce the best system of painting any particular project.

In using any spray gun there are a number of adjustments of extreme importance. These should be studied carefully. Best results are dependent upon the proper flow of material from the nozzle, correct proportioning of atomizing air pressure of flow of material, and proper spray width. The usual spray gun contains an adjusting screw which affords control of the flow of material from the nozzle. As mentioned above, to assure maximum ease in

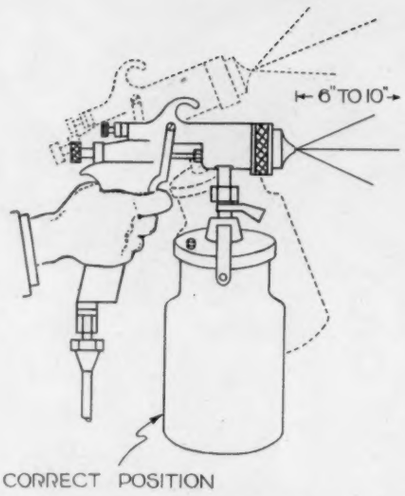


Fig. 2—Spray gun should be held perpendicularly to the surface as shown by solid lines here

triggering the gun it is recommended that this control be left wide open in practically all cases.

A second adjusting screw which is found on some spray guns controls atomizing pressure. Also, there is an air adjusting valve which can be attached to the air inlet of those guns not equipped with an atomizing pressure adjustment. A spreader adjustment affords a means of changing the spray pattern from a round spray to various width fan sprays as may be required.

In making adjustments of the spray gun, too high an atomization pressure is to be avoided since it will spread or thin out the center of the spray pattern. Insufficient air pressure will produce a spattered effect. This results in the material covering the surface in beads or drops. This adjustment can be checked by studying the spray pattern produced by the gun.

In working out a motion study on a particular product, an experimental period using various settings of the adjustments will be found of value in determining the most efficient operation. Note, too, the different results obtained by changing fluid adjustments, atomizing pressure and spreader adjustments.

Since flow of material from the gun nozzle determines the speed at which the gun must be moved across the surface, the speed of operation sometimes can be increased greatly by using a setting which permits faster flow of material. Then, to prevent excessive deposits of paint, work out a sequence of motions which will prevent overlapping of the spray pattern as the article is painted. A comfortably rapid stroke should result in sufficient coverage without runs or sags.

Keep Motions Continuous

Another important element which has been found to increase greatly the efficiency of spraying operations is the principle of keeping a continuity of motion, from the time the gun is triggered when starting to paint an article until the gun is triggered off and the article is completely painted. This does not necessarily mean that the entire article should be painted without

Fig. 3—Spraying corners this way results in depositing overspray

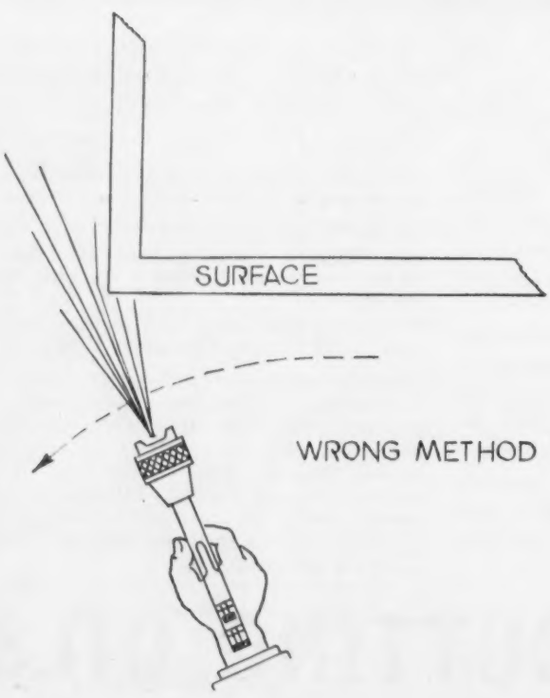
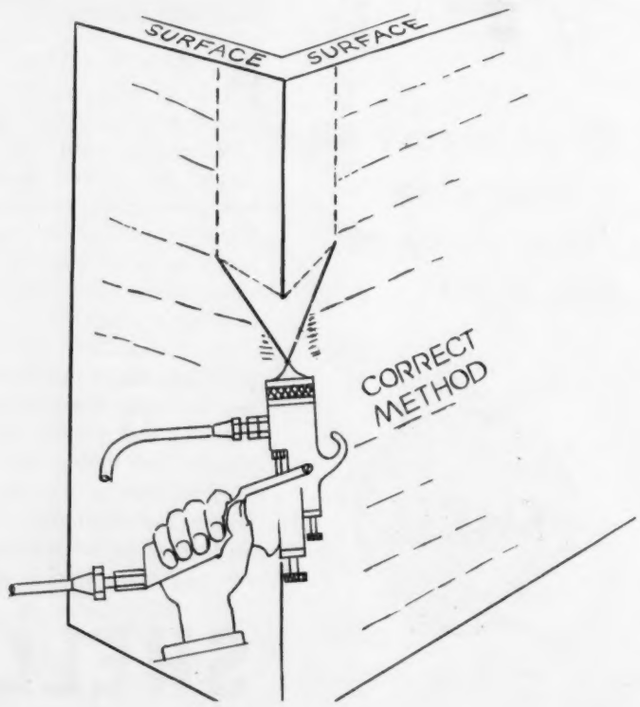


Fig. 4—Corners should be sprayed like this for best results



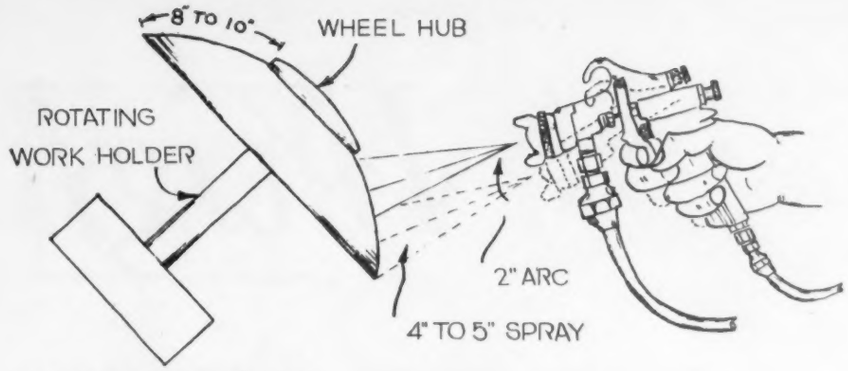


Fig. 5—Painting wheel hub in one continuous stroke using rotating work holder

shutting off the gun, but it does mean that this should be done wherever the shape of the article permits. It has been found that by mounting certain kinds of work on a fixture which can be revolved easily it is possible to paint such objects with one or two simple motions without shutting off the spray gun more than once or twice.

Such continuous, or nearly continuous operation of the gun will assure maximum coverage per unit of time and so will produce a maximum output from the spraying operation. In such work, it usually is necessary to provide a fixture to hold the object during painting and to permit rapidly positioning it from time to time for complete access to all portions. Then, by working out a suitable sequence of motions for the spray gun, complete coverage of the article can be obtained with a few rapid strokes and simultaneous or alternate movements of the fixture holding the work.

Instruct Gun Operators

Often the makers of the spray gun and associated equipment will be found able to furnish definite suggestions for improving results. Often suggestions made to the spray gun operators will enable them to greatly reduce fatigue connected with the work, and if this is explained to them when the motion study analysis is being made, it permits obtaining their cooperation more easily. An efficient and carefully worked out motion study may be the means of making a significant saving in painting operations as well as making possible a much higher production from the equipment.

Of course, it is most essential to follow at all times the directions of the spray gun manufacturer regarding the best way to clean the gun and to keep it in the best operating condition if maximum painting efficiency is to be obtained.

Acompanying illustrations will show typical examples of recommended practice in spray gun motion. Where the object to be painted is of such a shape that it can be sprayed while it is rotated, the gun can be held open from beginning to end of the stroke. For example, Fig. 5 shows method used in spraying of metal hubs of wheels. The work here is held and rotated by the work holder. For this job a 5-inch spray is used. As the hub rotates, the operator simply pulls the trigger back and turns the gun in a 2-inch arc, painting the hub in one continuous operation.

Zig-Zag Stroke Unnecessary

To zigzag this stroke or to start at the top and move to the bottom and back up again would be unnecessary.

Fig. 6 shows how continuity of motion can be worked out for a flat surface such as a table top. Also, this shows a diagram of how continuity of motion may be planned for solid objects such as cabinets, metal covers, cases, etc. In both of these cases the spray gun is triggered to feather out the strokes.

In any motion study for spray guns it is desirable to determine the fewest number of strokes and least amount of motion necessary to obtain the desired coverage. To this end, the design and use of suitable fixtures will be found a great aid.

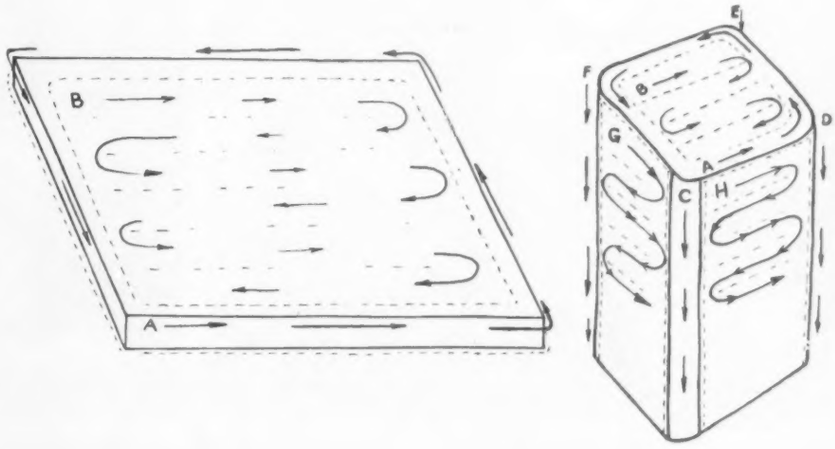


Fig. 6—Showing path of spray gun for most efficient spraying

Effect Of Elements In Alloy Cast Irons

■ *Alloy Cast Irons;* semiflexible imitation leather, 270 pages, 6 x 9 inches, 111 charts and illustrations, 73 tables; published by American Foundrymen's association, Chicago; supplied by STEEL, Cleveland, for $3; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W.1.

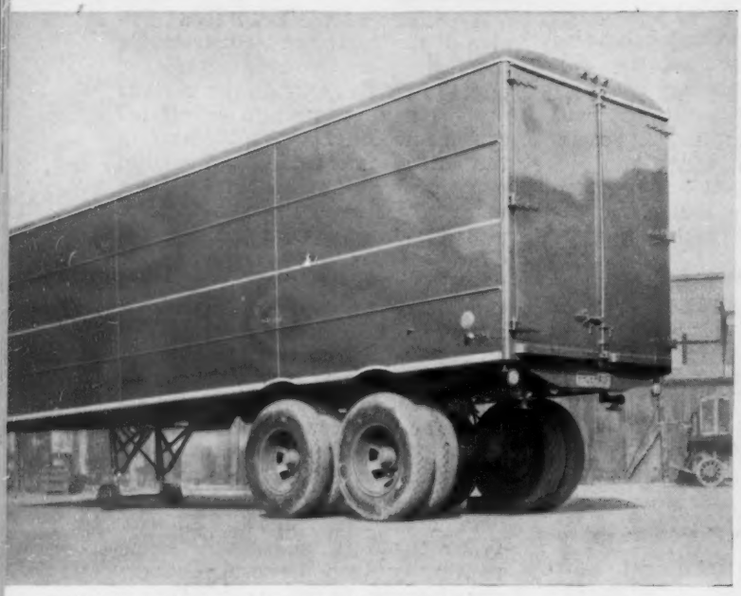
A project of the gray iron division of the American Foundrymen's association, this volume covers the effect of 18 elements on the various properties of gray, white and chilled cast irons. Information is given on the effect of aluminum, bismuth, carbon, chromium, cobalt, copper, magnesium, manganese, molybdenum, nickel, phosphorus, silicon, sodium, sulphur, titanium, tungsten, vanadium and zirconium on such properties as tensile, transverse, shear, torsional and impact strengths, hardness, deflection, machinability, wear resistance, heat resistance, corrosion resistance, mass and section, electrical properties, thermal properties, chill, etc.

It also discusses the forms in which alloying elements are available commercially and the different types that are added to various melting units. General foundry practice used in the manufacture of alloy cast iron, covering such subjects as melting, molding sands, heat treatment, shakeout practice, cleaning and finishing, etc., also is covered.

Of special interest is the chapter devoted to composition, mechanical properties, uses and service data on many types of alloy cast irons in commercial applications. For those desiring still more complete information on the subjects covered, a 25-page bibliography is available. The 14-page cross index makes the desired information easily found.

IT'S A DARE!

Weigh



1800 lbs. lighter—carries 1500 lbs. more payload. Ultra modern design utilizes U·S·S COR-TEN in the bridge-truss type body frame. Reduces weight of this Fruehauf freight trailer 1600 lbs. under standard. Compared with old equipment now on the roads, the weight saving is estimated to run as high as 4000 lbs. Unit is 33′ long, 8′ wide, 7′ high—weighs only 10,900 lbs. Built by Fruehauf Trailer Co. of California.

Hyster Boom-Arch built 20-30% lighter with U·S·S MAN-TEN. In this modern logging equipment, built by Willamette-Hyster Co., Portland, Oregon, the high yield point of U·S·S MAN-TEN makes possible substantial weight reduction without reducing high load capacity and great strength essential for this tough service. Saving weight leaves more horse-power available for work—permits faster return trips and safe operation up steeper grades. Increased footage handled, assures low cost operation essential for selective logging.

U·S·S MAN-TEN *reduces weight one-third, assures long life.* Vital in obtaining favorable payload-deadweight ratio in the face of highway load limit restrictions, the use of U·S·S MAN-TEN enables builder to reduce thickness of mixing drum and mixing blades of this Blaw-Knox TRUKMIXER by 33 1/3%. Abrasion tests reveal MAN-TEN also ideally suited to withstand the grinding action of sand, stone and cement—one reason why none of these drums or mixer blades has ever worn out in service.

U·S·S MAN-TEN *saves 3750 lbs. in this mine truck body.* 25 cu. yd. trailer dump truck for open strip mine hauling, built by United Iron Works Company, Pittsburg, Kansas. Body of U·S·S MAN-TEN weighs 14,800 lbs.—25% lighter than similar capacity trailer with structural quality steel body.

Any truck body user will be interested in a steel that will economically reduce deadweight like this. Weight saved can be converted into gasoline and oil savings, reduced tire and brake maintenance, extra carrying capacity.

U·S·S HIGH TENSILE STEELS

U·S·S COR-TEN · U·S·S MAN-TEN · U·S·S STAINLESS

Your Equipment

. . . AND COMPARE IT for lightness, strength and cost with U·S·S High Tensile Steel construction

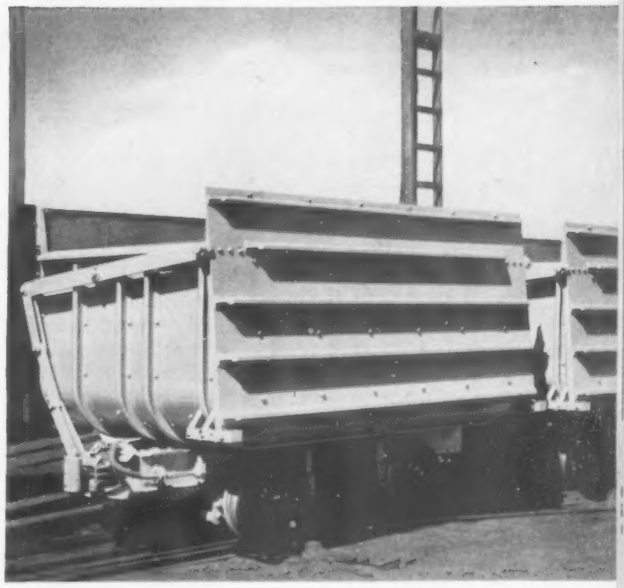
HERE'S a direct challenge to every user and builder of mobile equipment.

The safe reduction of deadweight with U·S·S High Tensile Steels—its resultant economies—its tangible returns in increased capacity and lower operating costs, are well-proved facts. You can't afford to overlook them.

Witness the typical applications illustrated. How does *your* equipment stack up? Is it still dragging around useless deadweight? Is it wearing out long before it should? Does it give you the capacity you have a right to expect? Rebuild it, *at low cost*, with service-tested U·S·S High Tensile Steels.

Both U·S·S COR-TEN and U·S·S MAN-TEN have yield points approximately 50% higher than structural quality open-hearth steel. Both are tough and hard wearing, highly resistant to shock and vibration —have ⅓ greater resistance to abrasion than mild steel. COR-TEN has unusually high resistance to atmospheric corrosion, 4 to 6 times that of plain steel. MAN-TEN equals copper steel in rust resistance.

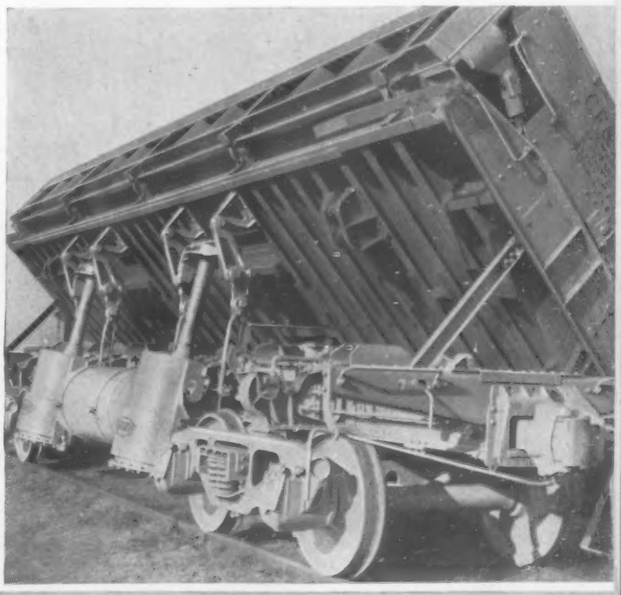
But because both these superior steels are *low* alloy steels—their price is low. Thousands of applications have proved they will reduce weight with little or no increase in cost. May we tell you more about them?



U·S·S MAN-TEN *mine cars weigh one ton less each.* In 200 of the Granby-type mine cars, MAN-TEN construction has reduced weight 2000 lbs. per car. Used with electric motor haulage, 45 cars to a train, this 45-ton weight reduction effectively reduces power consumption.

Welded U·S·S MAN-TEN *construction trims off 12,000 lbs. dead* Reduction of deadweight from 69,000 to 57,000 lbs. in this Austin-Western 70 cu. yd. railroad dump car substantially reduces motive power of hauling unit required.

A 6-car train of these lighter MAN-TEN-built cars actually weighs less than a train of 5 cars of the previous type.



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UNITED STATES STEEL

Welds To Be Carburized

Factors entering into selection of welding rod and welding procedure to produce welds to be carburized are discussed here. Tests reveal rod should be one producing least variation of grain structure and hardness between weld and parent metal

By **E. J. WELLAUER**
Metallurgist
Falk Corporation
Milwaukee
And
G. C. DOEHLER
Engineer
Hevi Duty Electric Co.
Milwaukee

■ THERE ARE applications in the machinery field where welds are used on parts which are to be carburized. In these cases, problems arise which are not ordinarily encountered in carburizing. The following experimental information was obtained to investigate the phenomena involved in carburizing weld metal.

The welds in the test joined forged and annealed SAE 2315 steel, a 3½ per cent nickel material, widely used as a carburizing steel for miscellaneous machine elements. Proportions of the weld and points at which hardness tests were made are shown in Fig. 2. Two specimens were welded for each of four analyses of rods. One specimen was peened with an air hammer after each pass, the other specimen was not peened. The coated rods were 5/32-inch in diameter with 140 amperes at 22 volts direct current. The SAE 2315 stock was forged and annealed. Welds were normalized at 1650 degrees Fahr., after which the weld bead was machined level with the parent stock. Specimens were carburized for 10 hours at 1700 degrees Fahr. in a vertical retort furnace using a gaseous carburizing medium. The sections to be hardened then were oil quenched from 1425 degrees Fahr. and drawn at 350 degrees Fahr.

Growth in section accompanies all carburizing reactions. In these specimens, the weld metal averaged from 0.001 to 0.002-inch less growth than the parent metal.

Cross sections of welds in carbon-molybdenum and 2½ per cent nickel steel were uniform and dense, indicating that carbon-molybdenum and 2½ per cent nickel steel rods produced the more desirable welds with procedures used in this test.

The case depth and variation between parent and weld metal are recorded in Table I. With the exception of the SAE 2315 rod, the carbon penetration into the weld metal was less than the penetration into the parent metal.

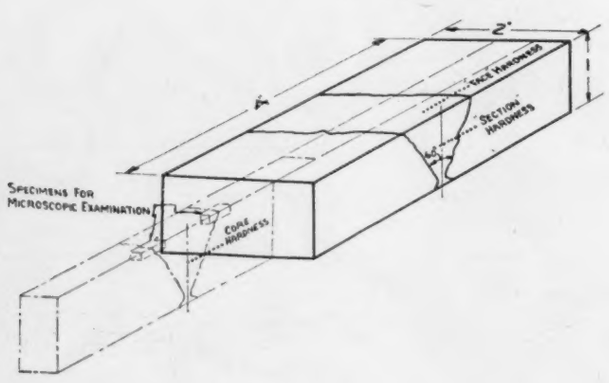
Depth of carbon penetration was practically equal for the various rods, except for the SAE 2315 rod where the greater penetration was probably due to the greater porosity of the weld. The carbon penetration into the peened and unpeened welds was practically equal.

Case carburizing is used for the purpose of securing a high hardness on a specified surface. Where welds are a portion of the useful carburized surface, it is important that the hardness obtained be within the limits specified for the parent stock. For the hardness readings, a special micrometer screw was arranged on

Abstracted from *The Welding Journal*, published by American Welding society, New York.

Fig. 1—Microstructure produced by using a straight carbon rod. Magnification 50 diameters

Fig. 2—Dimensions of specimen used in tests with location of points checked for hardness



Advertisement

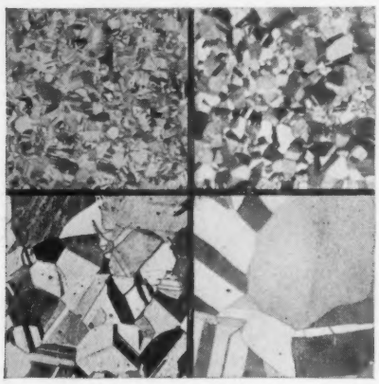
COPPER ALLOY BULLETIN

Reporting News and Technical Developments of Copper and Copper-Base Alloys

JUNE "Bridgeport" BRASS CO. 1939

GRAIN SIZE BEST MEASURE OF DEGREE OF SOFTNESS

The degree of softness of brass, a factor of extreme importance in many fabricating processes, can most accurately be expressed in terms of actual average grain size. The internal structure of brass is revealed upon examination under a high-powered metallurgical microscope when a sample is carefully ground and polished and then etched with a solution of concentrated ammonium hydroxide and hydrogen peroxide. The structure of annealed wrought brass consists of a large number of individual crystals or grains whose average size depends upon the temperature of the anneal. The higher the temperature of the anneal, the larger the crystals.



These micrographs illustrate the microstructures of brass annealed at various temperatures. Mag. 75X

The grain size is specified in terms of the actual average diameter of the crystals expressed in thousandths of a millimeter. Individual crystals are, of course, larger or smaller than the average size. Most of the commercial brasses (wrought metal) have a grain size ranging from approximately .010 millimeter to .090 millimeter. Converted into inches, the average grain size of wrought brass is approximately from .0004" to .0036". The individual grains or crystals of wrought brass are so tiny that even when the metal is properly prepared for microscopic examination, it is difficult to make out the structure with the naked eye. Cast brass, however, is much coarser in grain structure. Individual grains range approximately between 1/16" and possibly 1/4" in size.

Fine grained brass is suitable for stamping and forming because the surface of the metal even when stretched does not be-

(Continued on Following Page, Column 2)

MODIFICATIONS IN PHYSICAL PROPERTIES SIMPLIFY BRASS FABRICATION PROCESSES

Study of Problem by Supplier's Metallurgists May Reveal Opportunities for Cost Reduction or Product Improvement

The term "brass" covers such a remarkably wide range of alloys (composed of various proportions of copper and zinc) so different in appearance and physical properties, so easily workable, inexpensive and corrosion resisting, that it is no wonder that brass, one of the oldest alloys to be used by civilized man, is probably employed for more different items than any other alloy or metal.

The physical properties of each alloy can be radically modified by:

(1) Changing the composition.

(a) Modifying the proportions of copper and zinc.

(b) Additions of small amounts of lead, tin, aluminum, iron, arsenic, etc.

(2) Changing the temper, viz. ductility, hardness, strength, etc.

(a) Heat treatment to produce various gradations of softness and ductility.

(b) Cold working (reduction by rolling or drawing without subsequent annealing) to produce various gradations of hardness and stiffness.

Since the metallurgical laboratories of the brass supplier study the applications of alloys as well as their physical properties, they are in an excellent position to assist the manufacturer of metal goods by offering him technical information and advice in the solution of fabricating problems. In many cases the supplier's laboratory has been able to suggest a modification in physical properties which results in lower product cost or higher quality.

Typical Cases of Metallurgical Assistance

The following examples are typical of the assistance given to fabricators by the Bridgeport Metallurgical Laboratory, which provides this consulting service at no cost to Bridgeport customers.

A manufacturer had been using brass sheet, which contained a small amount of lead, for making razor guards which had to be blanked, milled, and cold worked. He complained that his milling operation was giving him trouble. The Laboratory's problem was to supply an alloy which would be so balanced that all of the three operations could be performed satisfactorily. The Laboratory recommended a brass with a higher lead content, with the result that a cleaner blank (more free from burrs) was obtained and the milling operation was improved. At the same time, the material was malleable enough so that the

(Continued on Following Page, Column 1)

Floating Copper Shot Makes X-Rays Sharper

Particles of copper so fine they float on water without breaking the surface tension help the scientists of General Electric Company to obtain sharp X-ray pictures of metal objects with irregular outlines. Because X-rays are absorbed unequally by air and metal, some parts of the conventional picture are blurred. When the copper shot is used, the background of the picture is sharply blocked out.

The spherical particles used are so small that ten million of them fit in a volume of one cubic inch. To make the X-ray picture, the shot is simply poured over the object to be photographed.

Left: Ripples in this radiograph of a weld obscure internal defects. Right: Ripples and "fuzziness" are eliminated by use of copper shot.

COPPER ALLOY BULLETIN

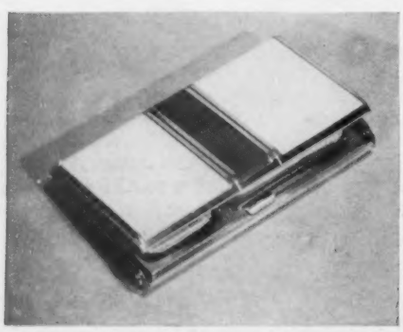
PHYSICAL PROPERTIES

(Continued from Preceding Page, Column 3)

necessary cold stamping operation could be performed.

Savings in finishing costs can often be effected by simply changing the temper of the brass. For example: A manufacturer of chromium-plated brass soap dishes and tumbler holders was able to cut down his polishing and buffing costs when he was provided with brass that had been annealed to produce a very fine, uniform grain structure. He had been using brass rolled 1 # (B & S) hard, which was much coarser in grain structure. When he changed to the fine grained material, he not only reduced his finishing costs but he also improved his quality.

For the manufacture of vanity cases and metal boxes, special care must be taken to supply brass suitable for this class of work. Here, inexpensive items must compete with expensive gold-filled, silver and real gold articles in appearance and workmanship. Certain compositions of brass are a perfect match for solid gold in color except that the finish of the brass must be retained by a good clear lacquer protection. For certain classes of work, the finished vanity case, for example, is given a matte dip (strong acid attack), producing a dull, frosted finish which is apt to reveal and



Control of finish in brass for vanity cases eliminates extra operations in securing brilliant finish and attractive appearance. Special alloys can be supplied to match gold in color.

emphasize any scratches or blemishes which may exist on the surface of the brass. In order to keep the finishing costs down, the brass mill must supply material with an exceptionally fine, clean surface and accurate in composition. At the same time, the grain structure of the brass must be carefully controlled so that operations such as polishing and buffing can be kept down to the minimum.

By "dry rolling," a brass manufacturer is able to produce brass or copper with a polished finish which is much higher in lustre than is found on brass rolled in the regular manner. For some purposes, such as linoleum stripping, picture frames, etc., this brighter finished material is very desirable. However, close examination of the surface reveals the presence of a series of fine scratches which had been produced by the burnishing action of the rolls. A manufacturer of brass initials for decorative purposes had been using dry rolled brass and complained that the minute scratches seemed to be more prominent after the material had been blanked. The Laboratory recommended brass with a fine grain but rolled 3 numbers (B & S) hard. The resulting material was not as high in lustre as the dry rolled metal, but was much more uniform and satisfactory on the finished job.

Since manufacturing methods are being speeded up by the use of more powerful equipment and machines designed for progressive operations, manufacturers of metal items can profit by progress in modern metallurgy. They will find the specialized experience of the Metallurgical Laboratory a great advantage in meeting difficult engineering requirements and severe service conditions.

GRAIN SIZE

(Continued from Preceding Page, Column 1)

come rough. Such material can be readily buffed and colored. If the grain structure is coarse, stretching and bending operations produce a rough surface on the brass which must be ground off if the material is to receive a highly polished finish. A medium grain size is recommended for severe cupping and drawing operations on heavier gages of metal, especially when the side walls are "pinched" during the drawing operation. Since roughness is in proportion to the size of the grain, the tendency is to keep the grain size down to the minimum consistent with the physical properties required and the operations involved.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. Further information on any of these items may be obtained by writing the Bridgeport Brass Company, which will gladly refer readers to the manufacturer or other source.

Hole saws are made in a range of diameters from ¾-inch to 3½ inches, and are said to be adapted for cutting clean holes in sheet metal. They are made in one piece from high-speed steel, in order to produce a fast-cutting tool that will retain its cutting edge for a long period of time.

A marking machine is said to be suitable for marking cylindrical or tubular brass pieces, such as ferrules, rings, and tubes. Machine is hand-operated, and will produce marks up to 1¼ inches long. The part is rotated during the marking operation, and the entire circumference can be marked, provided it falls within the 1¼-inch limitation.

A new anode for chromium plating consists of a thin film of lead bonded on a lattice-type frame of copper to form the base on which lead is built up to the desired thickness to complete the anode. Treatment with a lead-burning flame is said to remove blow holes in the coating, preventing the plating solution from penetrating to the copper core.

A buffing and polishing machine is provided with a device that automatically applies composition to the buffing wheels. Device is adjustable to handle varying amounts, and is operated by compressed air through a valve timed to correspond with the movement of the buffing machine conveyor.

A syphon breaker, built entirely of brass, is said to operate to force a clean supply of water into the cleansing tanks used in plating operations. Breaker is built on a Venturi principle. Water and air enter at the bottom of the tank, and acids and foreign matter washed from the material being cleaned flow off at the top of the tank. It is claimed that the admittance of air and water together allows the use of a smaller quantity of water than is normally required.

A fabricating machine is reported to handle a wide variety of sheet metal work. It is a simplified unit designed for use as a shear, flanger, or both. As a shear, it handles all straight and irregular cutting, including curves. A change of heads converts the machine into a flanger. Shoulder of the flanging rolls acts as a guide for the depth of flange. Machine is arranged for two cutting and flanging speeds.

A new retarder is said to be helpful in preventing "blushing" of nitrocellulose lacquers during the drying process in damp weather. Laboratory tests are reported to show that the use of the retarder does not increase drying time to an undue extent. The retarder has wide resin tolerance and high nitrocellulose solvency, and is therefore suitable for use with most lacquers.

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*Trade-name.

BRIDGEPORT BRASS

a Vicker's brinell machine to read at each 0.050 inch. A 50-kilogram load was used to give necessary penetration. A complete hardness exploration was made of the face and section of the weld. It was found that hardness readings from the center of the weld to the parent metal gave a good indication of the hardness characteristics of weld.

In the hardened case, the peened welds showed a slightly higher hardness than the unpeened welds, the difference not being sufficiently great to warrant the general adoption of peening. There is but slight variation in hardness between the carburized "section" and the "face" of the weld. The alloy rods produce a case which matches the parent metal case hardness for most practical purposes. The straight carbon rod would not be suitable because the resulting case hardness is too low.

In the core, the hardness of the peened and unpeened welds after quenching were substantially equal. With the exception of the SAE 2315 weld, the core hardness of the weld was lower than that of the parent metal. The peened and unpeened SAE 2315 welds had identical high hardnesses, indicating that the particular analysis undoubtedly absorbed some hardening element such as nitrogen, etc., during the weld process. The variations in core hardness are within commercial limits and will not affect the operation of the welded and carburized structures except for the SAE 2315 rods. Experience shows SAE 2315 rod has doubtful merits for case carburizing applications when welded by standard practices.

TABLE I—CASE DEPTHS

Rod	Condition	Depth of Case in Weld	Depth of Case in Parent Metal SAE 2315	Difference
2½ per cent Nickel	Peened	0.063 In.	0.075 In.	0.012 In.
	Not Peened	0.073 "	0.080 "	0.007 "
SAE 2315	Peened	0.100 "	0.070 "	0.030 "
	Not Peened	0.104 "	0.075 "	0.029 "
Straight Carbon	Peened	0.058 "	0.075 "	0.017 "
	Not Peened	0.060 "	0.075 "	0.015 "
Carbon-Moly.	Peened	0.060 "	0.075 "	0.015 "
	Not Peened	0.062 "	0.080 "	0.018 "

Hypereutectoid Zone Formed

A microscopic examination of the carburized welds revealed structures which ordinarily would not be suspected of existing. First, it was evident that the carburized microscopic structures on both sides of the junction of the weld were entirely different and sharply defined, even for the rod of the same analysis. Second, in the carburized weld metals, a large percentage of hypereutectoid zone was formed whereas there was little, if any, hypereutectoid zone in the parent metal.

The sharply defined boundary between the different structures is illustrated in Fig. 1 for the SAE 2315 weld rod. Dark portion is the ferrite of the parent metal. Carbon has penetrated considerably deeper into the weld metal. The void shown is typical of the porous structure resulting with this rod. The same boundary and structural differences for the straight carbon rod is shown in Fig. 3. In this case carbon has penetrated deeper into the parent metal. It would seem that the carbon prefers to penetrate through the parent metal by a longer path rather than penetrate through the junction.

The great difference in the structures of the outer case, especially of the formation of the hypereutectoid structure is illustrated by Fig. 4. All the rods showed this characteristic. Formation of a hypereutectoid zone is to be avoided because such a case, although extremely hard, also is brittle and susceptible to the development of cracks and grinding checks. As an average, the parent SAE 2315 metal had a

(*Please turn to Page* 75)

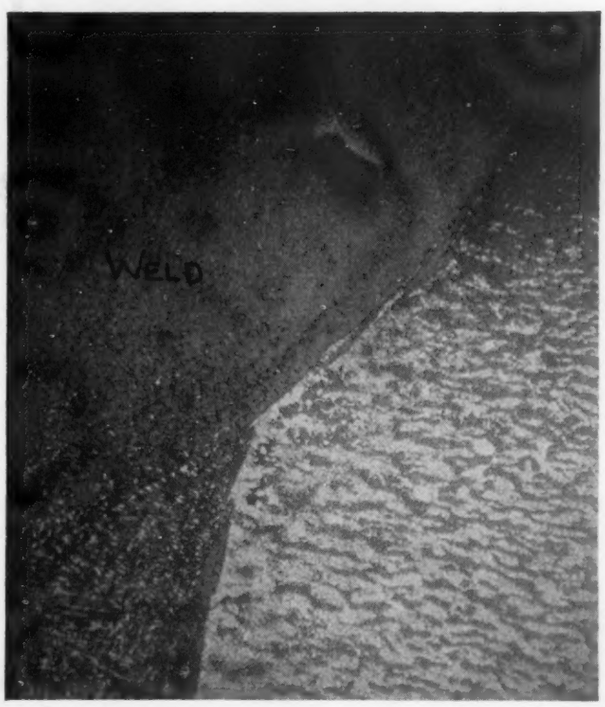


Fig. 3.—Structure produced by SAE 2315 rod, at 50 diameters

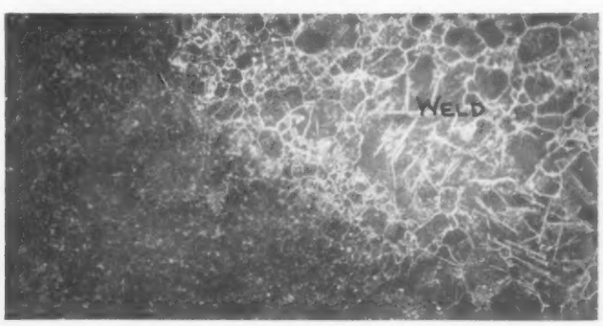
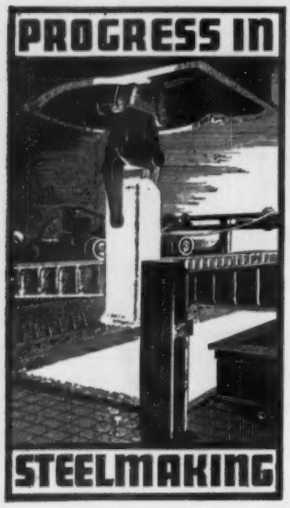


Fig. 4. (Just below)—Produced by carbon molybdenum rod, showing outer case structure at 100 diameters. Fig. 5. (At bottom)—Core structure produced by carbon molybdenum rod



Experimental Open Hearth

Intermediate size unit bridges gap between laboratory and mill. Series of tests shows furnace makes steel comparable with that produced in mill furnaces, thus assuring that results of experimental work can be applied successfully to large production units

By **DR. H. K. WORK**
Manager Research Division
and
M. H. BANTA
Research Engineer
Jones & Laughlin Steel Corp.
Pittsburgh

■ IT IS difficult to take research laboratory developments and place them directly into the mill. Attempts to do this generally result in a high percentage of failure. On the other hand, studies in the mill must be restricted to conditions which will permit a commercially favorable product; otherwise the costs are excessive. To bridge the gap between laboratory and mill, a pilot or experimental open hearth was recently constructed by Development division of Jones & Laughlin Steel Corp., Pittsburgh.

Desired size of experimental open-hearth furnace first appeared to be 1000 pounds. Below this size, heat losses become disproportionately large, and it is difficult to adjust the flame properly. Also, since it was desired to make rimming as well as killed heats in the furnace, it was decided to make the furnace large enough to supply at least a 1000-pound ingot for rimming purposes. For these reasons, first capacity was tentatively set at 1500 pounds. This later was increased 50 per cent.

Abstract from paper prepared for Open Hearth and Blast Furnace Conference, held in Cleveland, April 26, 27 and 28, 1939.

In small regenerative furnaces previously built, the lines appeared to be scaled down from larger furnaces except for some lengthening and narrowing of the hearth space itself. Such hearth distortion is a factor limiting minimum size.

Influence of firing method upon hearth lines is even more pronounced in small furnaces than in large ones. Scaling down of ports and burners of a large furnace is no assurance of success in a small furnace. Accordingly, burners were designed capable of supplying the necessary heat from a short flame with burner design, location and hearth lines adjusted one against the other to give best overall balance. In this furnace, the hearth is approximately circular and is fired by three burners. The dish-shaped hearth and roughly spherical interior space efficiently conserve the heat supply, are easy to build and maintain, and are convenient to work with in melting.

This 3-burner arrangement, however, was poorly adapted to usual design of regenerative furnace but since it is well suited to a one-way fired furnace, it appeared most desirable to build such a furnace and equip it with a recuperator. This latter unit uses carborundum tubes having high heat conductivity and

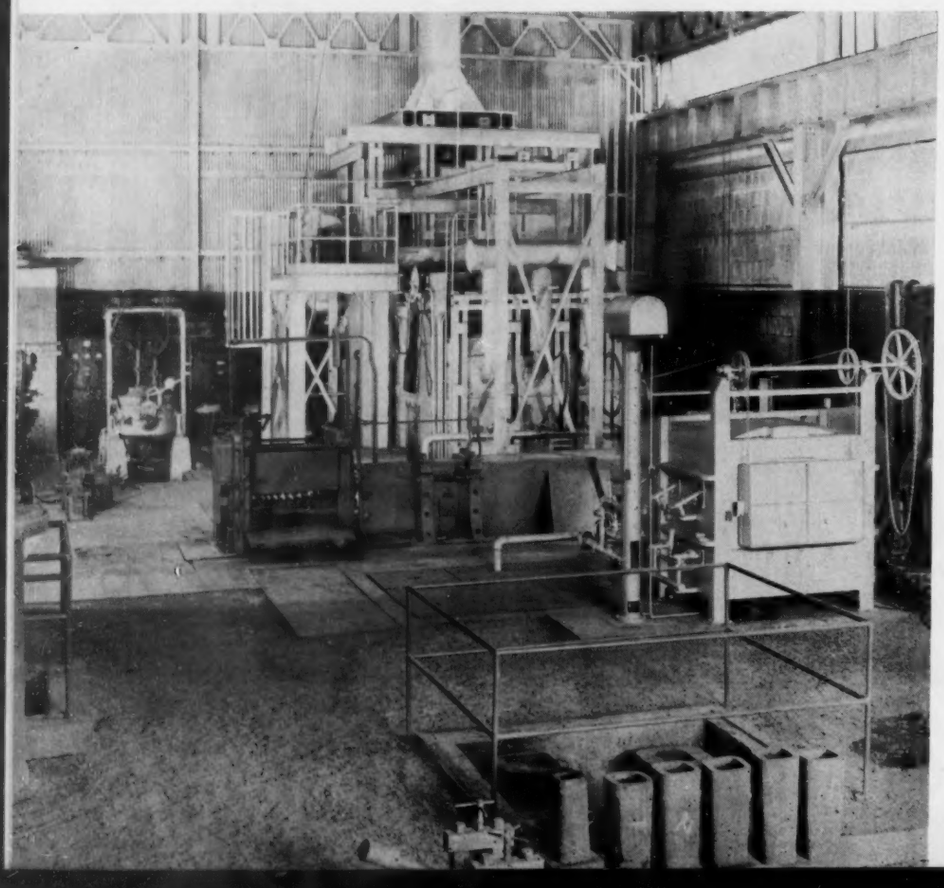


Fig. 1—Pilot plant open hearth with charging platform at left and furnace tapping pit on the right. In foreground is teeming pit with two 1000-pound ingot molds in place in pit and several small molds in front of pit

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TABLE I

Size	Grade
7″ x 29″ x 42″	Slab ..... Rimming
11″ x 11″ x 39″	Big-end-up, hot-topped ..... Killed
11″ x 11″ x 39″	Open top ..... Rimming or semi-killed
6″ x 6″ x 24″	Open top ..... Killed or semi-killed

arranged as shown in Fig. 2. This unit efficiently preheats air for the furnace.

Furnace dimensions are as follows: Bath at slag line is square, about 4½ feet on a side, with a dish-shaped bottom having a maximum depth of 1 foot. Bottom is magnesite, fused into a minimum depth of 6 inches on 6 inches of magnesite brick. Silica brick roof is arched from front to back on a 4-foot radius over a 6-foot 9-inch span. Maximum height of arch over bottom is 4 feet 5 inches. Tap hole is 6 inches in diameter. Charging door is 18 inches square. Furnace as actually constructed has been found large enough to accommodate a 2700-pound heat.

Between the exhaust port and the recuperator is a slag pocket 6 feet 9 inches long and 21 inches below the bottom of the exhaust port. This prevents ferrous oxide from being carried over from the bath to the recuperator. Clean-out door in slag pocket is about 18 inches square.

Recuperator, Fig. 2, employs two horizontal banks, each with 18 carborundum tubes equipped with core-busters. Tubes are 4 feet 4 inches long, 6 inches in diameter with a 1-inch wall. Exhaust gases flow upward around outside of tubes and escape through an 18-inch stack.

Air is drawn into front end of upper bank of tubes through a chamber in the back and passes out of the lower tube bank in the opposite direction. In normal operation, air is heated to 1200 degrees Fahr. and conducted through a well insulated pipe, 12½ inches in diameter, to a cross header above the three burners fed by separate 7-inch pipes.

Burning in the bottom required four days and 3550 pounds of Washington magnesite mixed with 16 per cent ground basic slag, giving a thickness of 6 inches in front of tap hole. Magnesite is used as required for patching.

Typical furnace charge consists of 50 per cent cold pig and 10 per cent stone. Billets from heats of open-hearth or Bessemer steel, identified by heat numbers, are used as scrap, so complete information concerning raw materials used may be at hand. Melting down the charge requires about 2½ hours. Usual duration of working period is about 1½ hours.

Reaction rates are such that removal of metalloids proceeds somewhat faster than in larger furnaces due to the bath being relatively shallow, increasing ratio of slag-metal interface to unit volume of metal bath.

Fig. 3—Tapping a heat from the experimental open hearth

It is general practice to deoxidize in the furnace whenever possible. Furnace deoxidation is especially desirable since heavy ladle additions have a decided chilling effect upon such a small heat. To insure a fast tap, a 6-inch diameter tap hole is used, closed with raw and faced off with double-burned dolo-

(*Please turn to Page* 76)

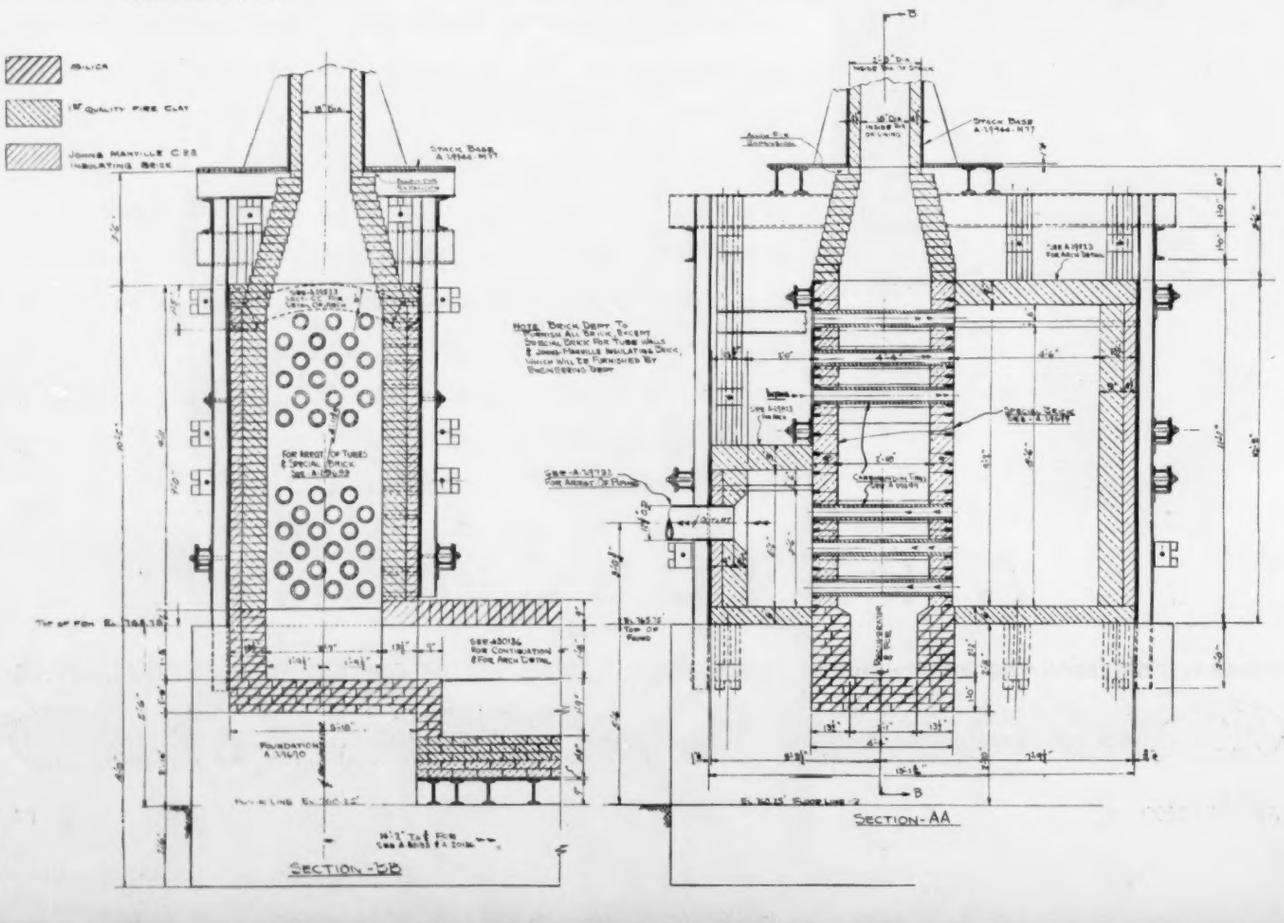
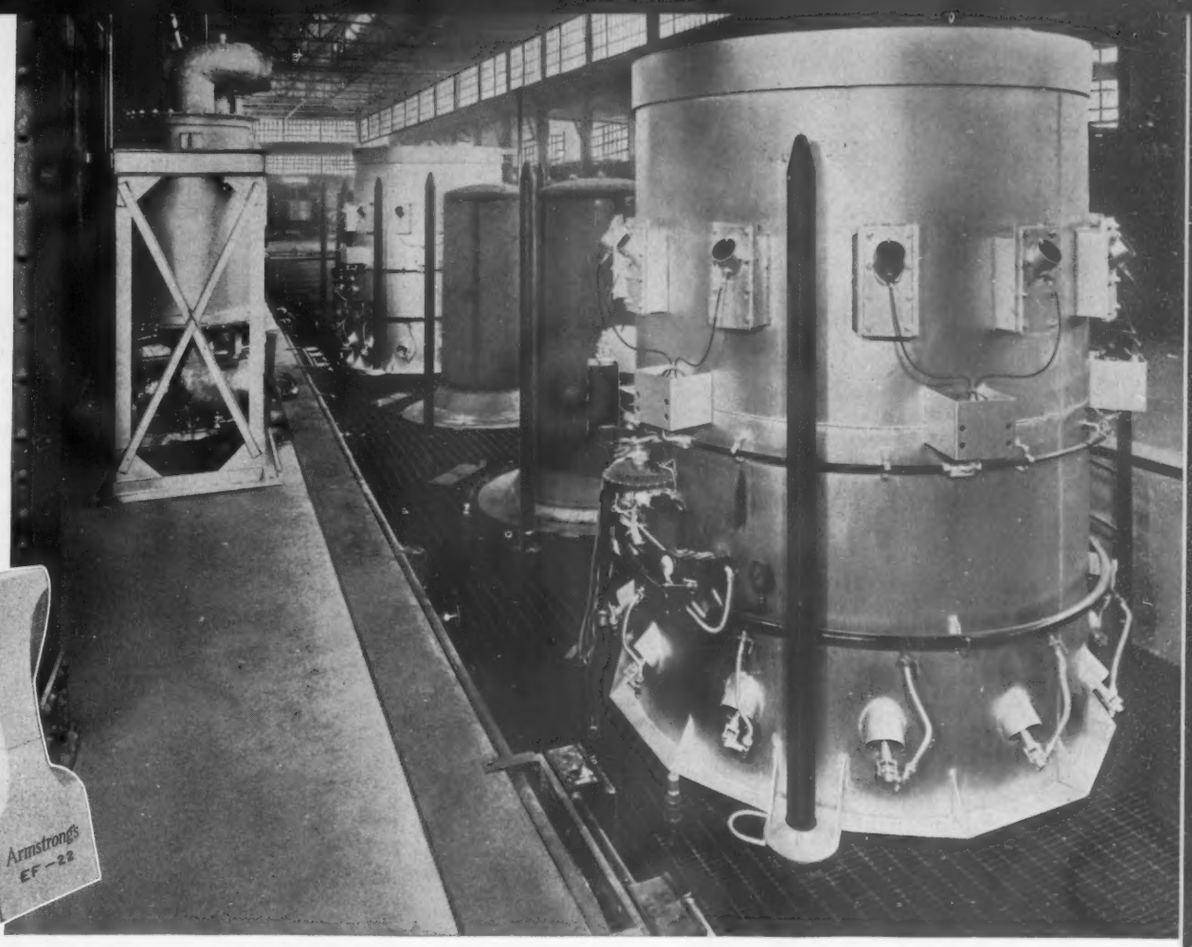
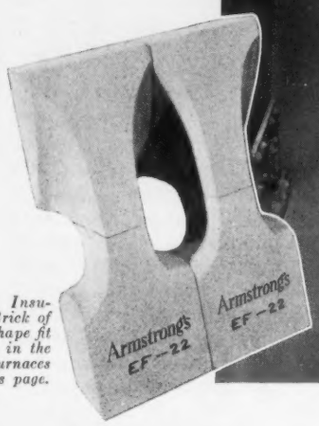


Fig. 2—Two sections through recuperator unit showing arrangement of carborundum tubes

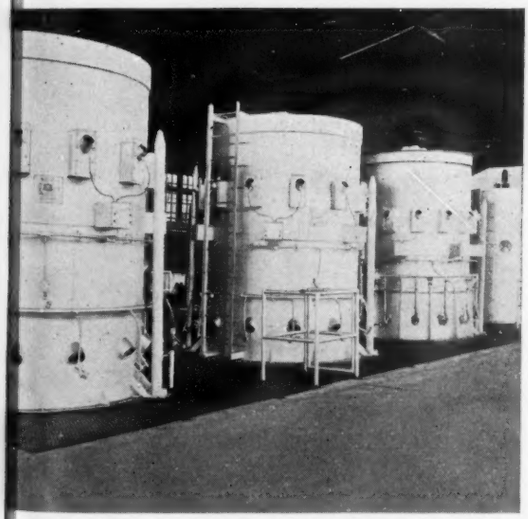


Two cylindrical bell type furnaces and seven bases built by the Lee Wilson Engineering Company of Cleveland for Detroit Steel Corporation. They are used for high carbon strip coil bright annealing. Armstrong Insulation in these furnaces aids fast, accurate heating with economy.



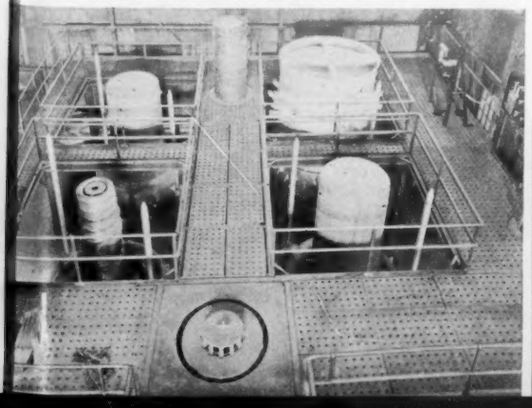
rmstrong's Insu- ing Fire Brick of special shape fit ound tubes in the Wilson furnaces own on this page.

THESE LEE WILSON ANNEALING FURNACES



This Lee Wilson installation for Superior Steel Corporation includes three furnaces and nine bases, for low carbon strip coil bright annealing.

For the Townsend Company of New Brighton, Pa., Lee Wilson built one bell type furnace and four bases for low carbon wire annealing.



use ARMSTRONG'S BRICK *for better heat contro*

SHOWN on this page are several installations of cylindrical bell type furnaces and bases, built by Lee Wilson Engineering Company, of Cleveland, Ohio. Armstrong's Insulating Fire Brick in each of these jobs aid fast, efficient operation and uniform temperature control.

There are several reasons why this insulating material is selected by leading furnace builders. The use of Armstrong's Brick assures lower fuel costs, more accurate temperature control, and a faster operating cycle. In many types of furnaces, these brick permit thinner furnace walls and larger hearth areas. Their ligh weight offers many construction ad vantages which combine with space sav ings to aid investment reduction.

Armstrong's Insulating Fire Brick ca be shaped as desired because they ar strong and have a uniform, workab texture. The special shape shown fit accurately around tube inlets and outlet in the Wilson furnaces.

Let us send you full details of Arm strong's High Temperature Insulatio Write today for samples and prices t Armstrong Cork Co., Building Materials Division, 985 Concord Street, Lancaster, Pennsylvania.

Armstrong's

HIGH TEMPERATURE INSULATION

INSULATING FIRE BRICK
HIGH TEMPERATURE BLOCK
PLASTIC CEMENTS
DIATOMACEOUS EARTHS

Metals Assume Important Part in High-Speed Transportation Units

■ ENGINEERING problems involved in the use of materials to reduce weight were considered at one session of the World Automotive congress in New York, May 22-26 (STEEL, May 29, p. 64). Two papers bearing on this general subject were presented at a truck, bus and railcar session. Col. E. J. W. Ragsdale, Edward G. Budd Mfg. Co., Philadelphia, confined his attention to low-alloy and stainless steels; Frank Jardine, Aluminum Co. of America, New Kensington, Pa., dealt with aluminum and its alloys.

Weight, which does not necessarily mean strength, is a continued economic burden to anything that moves; thus the increasing employment of special alloy steels in engineering, said Col. Ragsdale. In the use of ferrous metals the aviation industry has taught an appreciation of structural values in the reduction of weight with retention of strength, actually increasing tensile strength by the adoption of alloy steels. Aviation has demonstrated that pound costs are about the same whether payload or vehicle load and as a result engineers have become weight conscious as well as streamline minded.

Stability Is Important

Light-weight construction was defined by Col. Ragsdale as the superior use of superior material, declaring that stability is the keynote of all light-weight fabrication. To stability must be added resistance to corrosion and in the case of closed sections which cannot be painted, corrosion resistance is almost imperative. Practically all types of alloy steels offered for light-weight construction claim corrosion resistance.

In the former a protective coating of tenacious rust is quickly formed, a rust which does not flake off as readily as that formed on mild steel, resulting in a longer length of service, four to six times longer. Col. Ragsdale declared the choice between the low alloy group and stainless often is a matter of economics.

Advantages claimed for stainless included strength, notably by annealing and cold rolling; resistance to elevated temperatures, at 1000 degrees Fahr. retaining 60 per cent of its strength; high fatigue endurance limit, 79,000 pounds per square inch, as compared with 25,000 pounds for mild steel; and impact resistance at lower temperatures. Also, according to Col. Ragsdale, 18-8 stainless is the only structural metal which can actually be toughened by welding and which requires no subsequent correction through annealing. This is not true of all forms of welding, but applies to the shotweld system, he explained.

Where no great weight reduction is required, and where the economics of the project do not justify a more expensive material, low alloys serve a useful purpose. Because they possess tensile strengths some 30 per cent greater than that of mild steel there can be an almost equivalent saving of metal and because they have a somewhat superior corrosion resistance, there is little increased liability to corrosive attack through the use of thinner gages.

Since light-weight construction involves more fabrication than does a conventional structure, that fabrication must be made as simple and as economical as possible. The shotweld process provides inexpensive assembly, Col. Ragsdale declared.

General tendency to increase speed of all forms of transportation with a reduction in operation costs has had a profound influence on the use of nonferrous metals, notably aluminum in the construction of buses, according to Mr. Jardine. He stressed the high tensile strength of aluminum and its advantages of light weight. The advent of air conditioning in intercity type buses has placed an additional premium on light-weight design. Equipment required has increased the weight of the vehicle, and, according to Mr. Jardine, bus designers are now working to keep air conditioning equipment as light as possible and attempting to reduce the weight of the remainder of the bus to compensate. Use of aluminum for window sash, doors, interior finish, rear axle housing and wheels and its advantages as a saver of weight, was pointed out.

Models Aid in Weld Design

■ COMPLETION in England of successful tests of an all-welded model of a plate girder which will contribute to a better understanding of many engineering problems encountered in building the full-size all-welded structures employed in skyscrapers, bridges, ships and houses, is reported by the welding research committee of the Engineering Foundation, New York.

Cost of experimenting with models weighing less than 60 pounds is but a fraction of that entailed in using the ordinary girder weighing more than 7000 pounds, it is explained, making it possible to investigate a wider variety of designs and methods of fabrication. The results of such studies will lead to more economical and safer construction, the report declares.

Data obtained from the tests are extremely important today, it is pointed out, because of increased demand for all-welded structures in prefabricated houses, low-cost housing projects, shipbuilding, and other forms of construction.

In the shipbuilding industry, for example, statistics compiled by the American Bureau of Shipping for the American Welding society reveal that 138 of the 155 vessels under 300 feet constructed in 1938 were all-welded. Of the nearly 120 vessels built in 1930, less than five were all-welded. In recent years larger ships, including 18,000 ton oil tankers, have been all-welded.

The model used in the experiments weighed 58 pounds, or 1/125 as much as its prototype. It was fashioned of 14-gage steel and was 8 feet 2 inches long with a depth of 9¼ inches. Most important result of the tests from the point of view of the building industry was substantiation of the belief that external loading releases in a considerable degree residual strains and stresses in correctly-designed all-welded mild steel structures, according to the report.

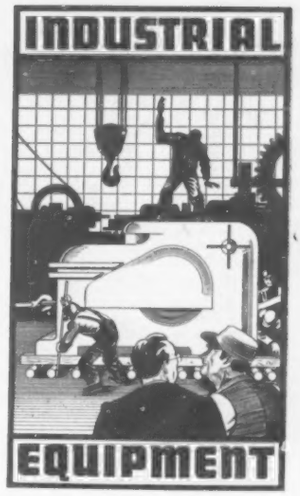
Girders Withstand Loading

Engineers have long been critical of all-welded girders, it is explained, doubting their ability to hold up under heavy external loadings because of the strains and stresses put into the girders themselves by the welding process. The experiments revealed that as far as static loads were concerned, their application relieved these inner stresses.

"By means of electric arc, or fusion, welding, maintenance of geometrical similarity between steel models and full-sized construction is greatly facilitated, provided that the difficult operation of welding thin-gage metal has been first successfully mastered, the report says.

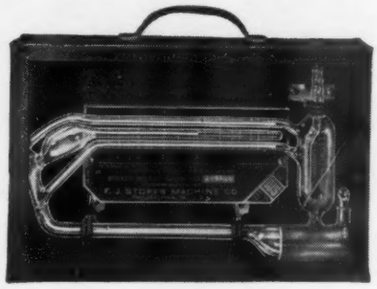
"Models made by this process are particularly apt and useful. Not only may the welding procedures and resulting strains and stresses be exactly estimated but also the behavior of the finished product under predetermined loads may be predicted.

"Tests with the model proved that correct welding procedures applicable to electric arc welding in naval architecture and structure and mechanical engineering may be studied quickly at small cost, thus enabling a more intensive program of research pointed toward obtaining more economical and safer structures."



High-Vacuum Gage

■ F. J. Stokes Machine Co., Tabor road, Philadelphia, has developed a portable, high-vacuum McLeod type gage which covers pressures from 0 to 5000 microns and will not spill mercury. A single reading is taken in 2 to 5 seconds and continuous readings are made in rapid succession (not more than 10 seconds each). Readings are in microns on center capillary. Unit weighs 4½ pounds with mercury and measures 7 x 11



x 2 inches. Tubing is of extra-heavy Pyrex glass annealed to remove internal strains. No hammering action of mercury is possible at any point.

Metallurgy Aid

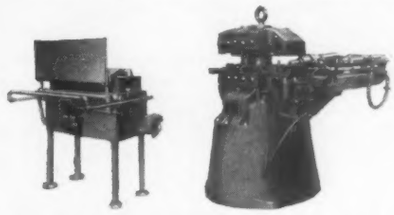
■ Fisher Scientific Co., 711 Forbes street, Pittsburgh, has developed the Elecdropode for qualitative and quantitative analyses in both organic and inorganic chemistry. Its operation is based on two facts: when dropping mercury electrode is employed, an ion in solution makes its presence known by a current increase which takes place at a definite voltage; and there is a definite relationship between the amount of current increase at that voltage and the concentration of the ion causing that current increase. Unit has been used for determination of copper, lead and cadmium in commercial zinc; copper, nickel and cobalt in steels, etc. Only a small amount

of low concentration of solution is necessary, extensive analytical work having been conducted with as little as 0.005 cc. of solution. List price is $295.

Furnace And Sharpener

■ Ingersoll-Rand Co., Phillipsburg, N. J., offers its 27F oil furnace and IR54 drill steel sharpener. Furnace is equipped with flame blower, heat deflector and preheating chamber through which low-pressure air passes before entering burner. Hearth opening is 3 x 27½ inches, over-all dimensions are 38 x 46 x 54 inches, air consumption is 10 to 20 cubic feet per minute, oil consumption is 2 to 4 gallons per hour. Furnace is recommended for use with IR54 sharpener.

Dies are secured in place by



through-bolts tightened from front on sharpener. Air receiver and exhaust muffling chamber are incorporated. Blow heads remove all scale. Hinged-type safety block can be tipped into position without danger of getting hand into cross head. Air pressure required for most efficient work is 70-100 pounds per square inch.

Enclosed Diesel Engine

■ Worthington Pump & Machinery Corp., Harrison, N. J., offers its type CC totally-enclosed 4-cycle trunk-piston Diesel engine. Provision for

expansion is made in cone-type cylinder head and no gasket is needed between cylinder head and liner. All moving parts are pressure-lubricated, and cylinder walls have positive sight-feed lubrication.

Small-Hole Gage

■ The L. S. Starrett Co., Athol, Mass., has gages No. 829 for measuring small holes and internal dimensions less than those ordinarily handled with telescoping gages. They are available in sets of four gages covering ranges ⅛ to ½-inch. End of each gage is in form of a split ball which is expanded by a cone controlled by knurled knob at

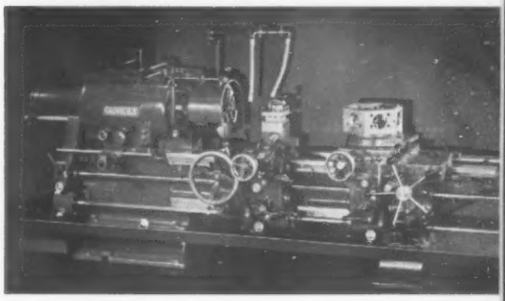
end of handle. Ball is placed in hole, expanded to get the "feel" and measurement transferred to a micrometer.

Frequency Changer

■ Forbes & Myers, Worcester, Mass., has developed a frequency changer for testing 25 cycle apparatus. Built as a single unit, it makes available 110, 220, 440 volts at 25 cycles from 60 cycle line.

Turret Lathe

■ Gisholt Machine Co., Madison, Wis., has improved its 1L and 2L turret lathes and added the 3L model. Bar capacities range from 2½ to 4½-inch diameter and from 36



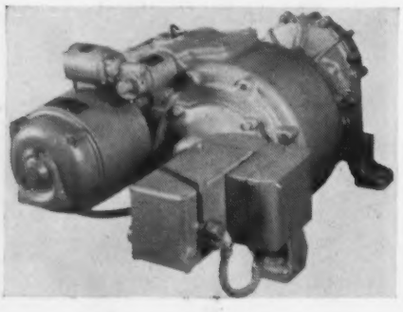
to 48 inches in length. Swing over ways is from 19 to 26 inches and chucks are from 12 to 21-inch diameter. Headstocks have 12 spindle speeds arranged in geometrical progression ranging on 1L and 2L machines from 20 to 486 revolutions per minute and on 3L from 12 to 333 revolutions per minute. Direct reading speed plate is mounted on headstock. Both longitudinal and cross feeds of cross slide have sixteen reversible power feeds in two ranges of eight. Longitudinal feeds range from .004 to .136 and cross feeds from .002 to .068 and 1L and .002 to .084-inch on 2L and 3L machines. Built-in taper attachment is available for cross slide and is provided with standard guide plate for cutting tapers up to 1½ inches per foot and 12 inches maximum length.

Demagnetizer

■ The Blanchard Machine Co., Cambridge, Mass., has a demagnetizer adjustable for gaps from 1 to 6 inches which produces an intense alternating magnetic field between poles to demagnetize articles which are placed in gap and slowly withdrawn. Heavy high-speed steel tools are completely demagnetized in a few seconds. Several hundred small pieces held in a wire basket can be demagnetized at once, the entire operation requiring less than half a minute.

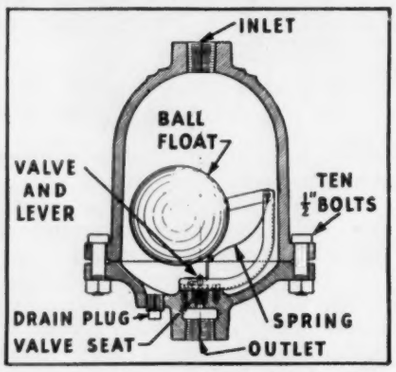
Automatic Speed Control

■ Sterling Electric Motors, Telegraph Road at Atlantic boulevard, Los Angeles, has developed a 3-horsepower speed control. Unit gives output shaft speeds of 60 to 15 revolutions per minute, arranged with electric automatic control. Speed of output shaft is governed by position of small lever on control box. Lever travels through an arc of approximately 60 degrees for complete speed range and is provided with over-travel to prevent damage to switch mechanism. All electrical contacts in entire system are quick break and completely enclosed. Units are available in various ratings up to 15 horsepower with all standard gear ratios and motors completely enclosed.



Snap-Action Air Trap

■ Armstrong Machine Works, Three Rivers, Mich., has announced an automatic "snap-action" mechanical trap with positive opening and closing of discharge valve and freedom from need of priming for draining water from compressed air lines without loss of air. Ball float is connected to short valve lever through a flat strip of stainless spring steel which is bowed downward in closed position. As water enters trap, float rises bending spring. Just before float reaches top of trap, spring bends past dead-center, bows upward and snaps valve wide open. As water level drops in trap, cycle is reversed and valve snaps shut. Capacity is 1400 pounds of water per hour at 125 pounds and 1000 pounds per hour at 250 pounds pressure.



Lamp Guard

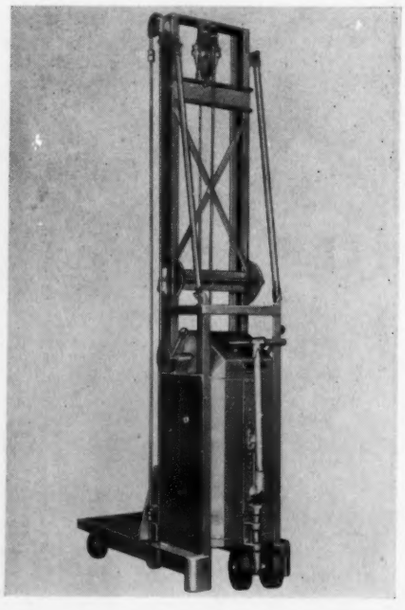
■ McGill Mfg. Co., Valparaiso, Ind., has introduced No. 7100 series of portable guards having a cage constructed of ten extra-heavy steel wires electrically welded and cadmium plated. Unit will not roll when laid down and is fastened to handle by a cam arrangement which enables changing lamp without tools.

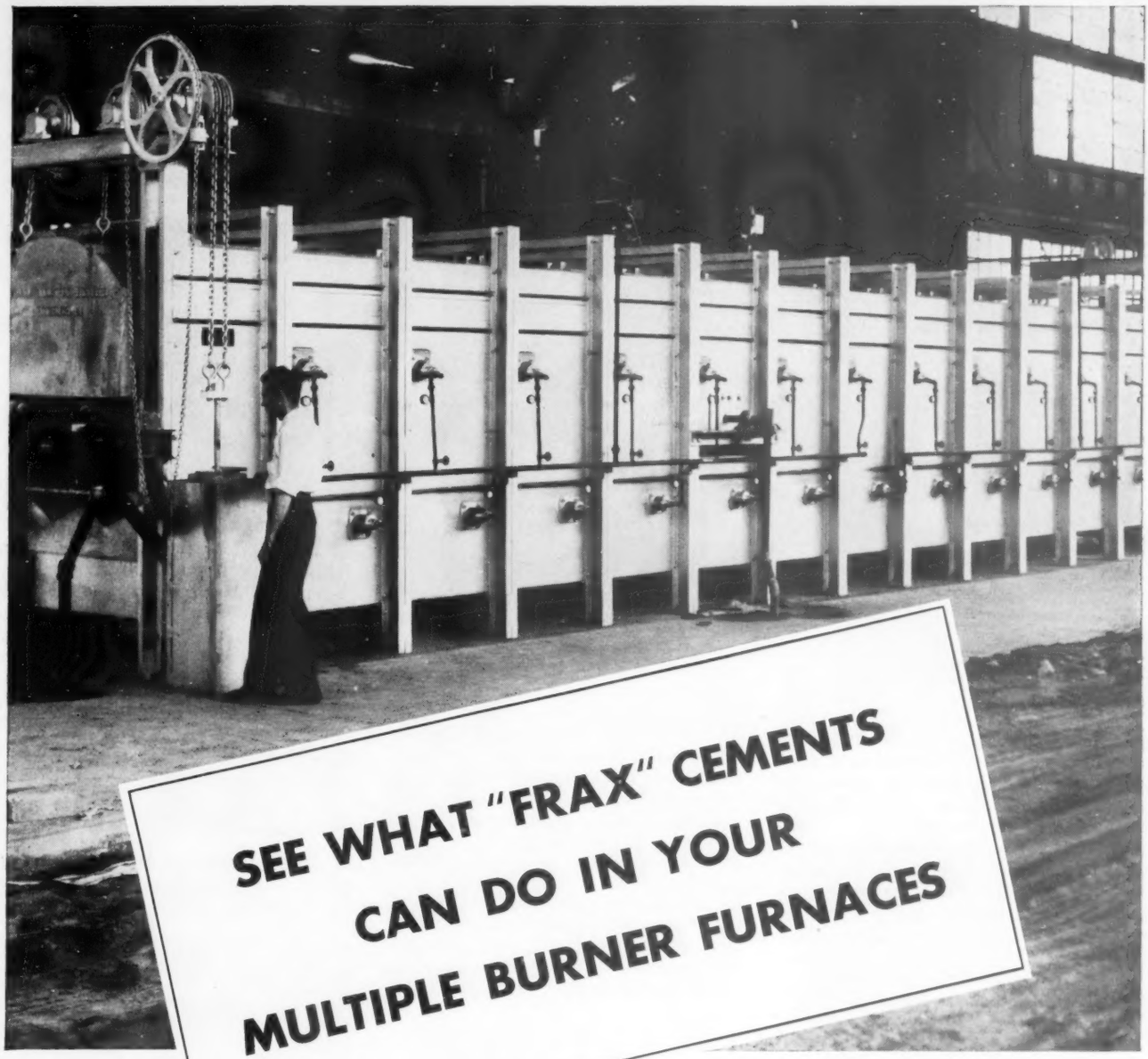
Pneumatic Die Cushion

■ The Dayton Rogers Mfg. Co., 2830 Thirteenth avenue south, Minneapolis, offers "C" pneumatic die cushions in six sizes having piston diameters from 6 inches to 16 inches progressing by 2 inches and drawing capacity from 3 inches to 7 inches. No surge tanks are necessary in drawing shells up to depth of 1½ inches. When cushion is not needed, air in cylinder can be bled allowing pin plate to drop down to bottom of its maximum drawing capacity. Pneumatic regulator and gage maintains predetermined constant pressure on cylinder.

Stacker Control

■ The Lewis-Shepard Sales Corp., Watertown, Mass., has developed a new type stacker operating control which allows operator to control machine from either side. In hinged stackers, control is self-adjusting as cable is automatically extended and taken up by long spring within





SEE WHAT "FRAX" CEMENTS CAN DO IN YOUR MULTIPLE BURNER FURNACES

THE question of burner maintenance and repair becomes increasingly important in steel and heat treating plants with the increasing use of modern furnaces utilizing a multiplicity of burners. The large number of burner tunnels and burner blocks to be kept in operating condition makes necessary the use of a refractory particularly suited to the conditions of service, if excessive maintenance costs are to be eliminated and possible furnace shutdowns minimized.

The "Frax" group of burner cements, comprised of "Carbofrax" (silicon carbide) "Alfrax" (fused alumina) "Mullfrax" (electric furnace mullite) and "Mullfrax" S (sillimanite), assure low maintenance cost and satisfactory service from your burner equipment because they have been developed specifically for this purpose, are easily installed and are extremely refractory.

Selection of the proper cement for your particular conditions can be made by our factory representative at our nearest office. Why not ask him to call for a discussion of your problem.

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(Carborundum, Frax, Carbofrax, Alfrax, Mullfrax and Mullfrax S are registered trade-marks of The Carborundum Company)

controller handle, eliminating problem of loosening hoisting cable when letting down top section.

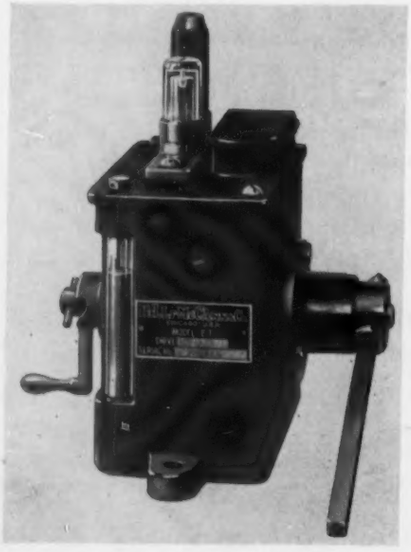
Battery Charger

■ General Electric Co., Schenectady, N. Y., has announced Phano-Charger, a self-regulating electronic battery charger having no moving parts and available in 4.5 and 12.5 amperes to operate from single-phase power supply and 25 amperes for 3-phase AC supply. Adjustable over a wide voltage range, it will trickle-charge a fully charged bat-

tery. Voltage characteristic is flat from no load to full load and then breaks abruptly into a relatively constant-current characteristic. Regulation is maintained within plus or minus 1 per cent from no load to full load and for a variation of plus or minus 5 per cent in line voltage. Saturable reactor provides close regulation and protection for tubes.

Lubricator

■ Hills-McCanna Co., 2349 Nelson street, Chicago, has announced a force-feed lubricator, in four types ranging from 1 to 60 feeds, which delivers a fraction of a drop of oil



to 10 drops per stroke at 2000 pounds per square inch. Lucite built-in sight feed is never under pressure.

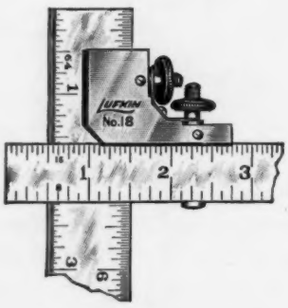
Electric Hoist

■ Coffing Hoist Co., Danville, Ill., has announced Quik-Lift electric hoist in capacities from 250 to 4000

pounds. Unit weighs 89 to 195 pounds and has lubri-sealed ball bearings, gears and pinions sealed and running in oil, drop forge hooks designed to stand 200 per cent overload, load chain that will not kink or bend, shoe type brake and either load hook or trolley suspension.

Rule Clamp

■ Lufkin Rule Co., Saginaw, Mich., has marketed a rule clamp for holding at right angles a combination-square blade and any steel rule not over one inch wide. Clamp also can



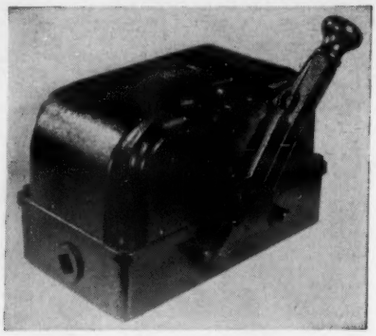
be applied to thin steel squares. Clip holds both clamp nuts in place and prevents their interfering with each other. Thumb nuts are knurled.

Face Shields

■ American Optical Co., Southbridge, Mass., has designed face shields for light duty work. Shield may be thrown up when not in use, and friction joint at adjustable headband holds it firmly in either "on guard" or "off" position. Windows are clear, amber, or green and aluminum binding strip gives them rigidity, yet permits shaping. Shields may be worn with or without prescription glasses.

Master Switch

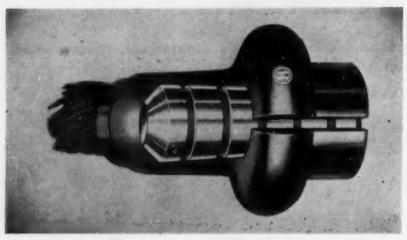
■ Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., announces a heavy-duty master switch for mill



and crane controllers. Giving a definite "feel" of operating points, it is provided for either hand or foot operation, for vertical or horizontal mounting. Group mounting is facilitated by a cover which can be removed vertically. Positive operation results from cam-opened, spring-closed arrangement which eliminates any possibility of contacts remaining closed on a point where they should be open.

Rail Bond

■ A rail bond for bonding around joint plates and for cross bonding has been announced by Ohio Brass



Co., Mansfield, O. Bond, type ETP, is of standard stud terminal design except terminal is slotted and drilled to permit insertion of tapered steel pin. Terminals are of copper with sleeve construction around strand to dampen vibration and prolong bond life. Tapered steel pin is ribbed to provide a positive lock when driven into terminal. Bond may be easily reclaimed by driving tapered steel pin out of terminal from other side of rail.

Kerosene Lubrication

■ Norton Co., Worcester, Mass., announces grinding machines with kerosene lubrication, of mirror-finished grinding wheel spindles. Spindles are accurate in size and straightness to 0.0001-inch and reading from 1 to 2 microinches on profilometer.

In tests, increase in lubricant temperature was 9.4 per cent over room temperature with kerosene and 68 to 73.5 per cent with oil.

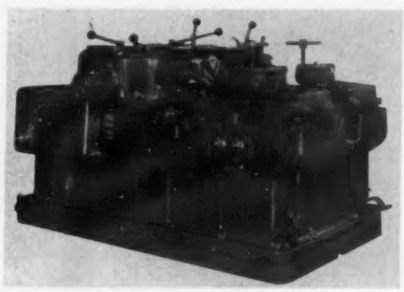
Electric Counter

■ An electric counter to automatically register the total number of hours that any electric device or motor driven machine has been in operation is marketed by National Instrument Co., 44 School street, Boston. A small slow-speed self-starting synchronous motor drives a set of numbered wheels through a gear train. Meter is 3 9/16 x 3¼ x 2⅛ inches in size and has maximum registration of 99,999.9 hours. Right hand figure reads tenths of hours. Rating is 110-125 volts, 60

cycles and 2 watts. Connections may be made directly across the terminals of any alternating current device of same voltage and frequency rating.

Turning Machine

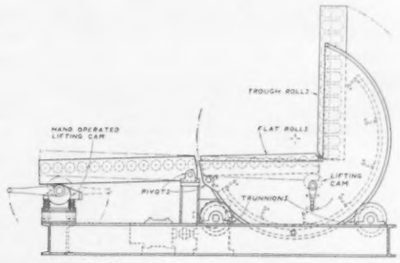
■ Landis Machine Co., Waynesboro, Pa., has announced its improved, simpler Lanhydro hydraulically operated turning machine. Hydraulic cycle, started by depression of foot pedal, is more flexible to suit every kind of material. Position at which fast forward speed of carriage is checked is made adjustable for jobs of different lengths.



Variable coarse feed is used throughout for turning operation. Carriage stops under variable fine finishing feed and variable dwell period permits final clean-up cut, making it possible to hold work to extremely close limits in length. Turning head automatically closes as carriage returns.

Two-Way Turnover

■ Logan Co., Louisville, Ky., has developed two-way turnover with adjustable slope provided for leg of turnover and corresponding adjustable slope for loading section of rolls which feeds coils to or receives them from the turnover. This adjustable slope, available for both legs, permits coils to roll onto turn-



over or away from it. Cam shafts operated by hand lever adjust slope of turnover leg and loading section. Auxiliary section on flat roll side is loaded and unloaded by magnet crane, and trough roll side by ram truck.

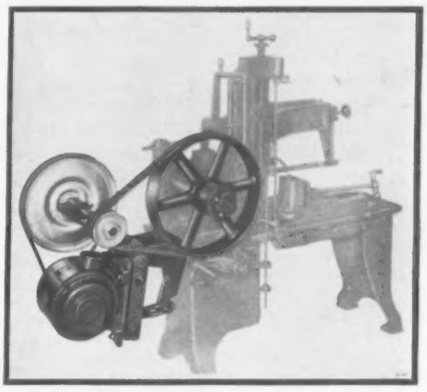
Industrial Truck

■ A small industrial truck-tractor, type IE, with a rated capacity of 3000 pounds is built by Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland. Truck has four speeds forward and four reverse. Wheel base is 37 inches and overall length is 84 inches. Frame is made up of heavy section formed plates

welded into rugged one-piece construction including control dash and pedal guard. Platform is fitted with detachable end gate which may be adjusted to carry additional load. Truck also is made to pull trailers. Drive unit employs free coasting high efficiency worm and gear. Truck is built under the Underwriters laboratory's re-examination service.

Conversion Drive Unit

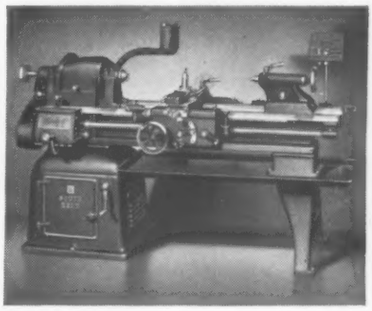
■ Quality Hardware & Machine Corp., 5839 North Ravenswood avenue, Chicago, is manufacturing a motor drive which is applicable to any belt-driven machine and is especially suited for converting line



shaft drives on cone pulley machines to individual motor drives. "V" belts are used for motor drive to countershaft, the final drive being by standard flat belt. Control is hand operated, though units can be equipped for electrical controllers.

Swing Lathe

■ South Bend Lathe Works, South Bend, Ind., has a 14½-inch lathe in motor drive and countershaft drive in bed lengths of 5, 6, 7, 8 and 10 feet with distance between centers of 24½, 36½, 48½, 60½ and 84½



inches in quick change gear and standard change gear types. Headstock spindle is alloy steel carburized, hardened and ground with phosphor bronze bearings. Specifications include swing over saddle of 10½ inches and thread cutting range of quick change gear model of 4 to 224 screw threads per inch. Metric lead screw and metric graduations are available. Attachments include hand lever type draw-in collet chuck, hand lever tailstock, hand lever double tool slide, oil pan, pump and piping, turret attachment and 4-way tool post.

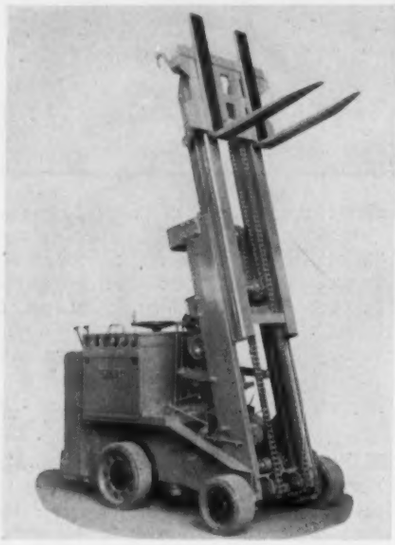
Salt Tablet Dispenser

■ Davis Emergency Equipment Co. 55 Van Dam street, New York, has a salt tablet dispenser of black plastic chemically inert to salt. When knob at bottom is turned in either

direction, one tablet is dropped into palm of hand. Large size holds 1000 tablets, and small size, suitable for mounting on truck serving field workers, 500.

Telescoping Tilt Truck

■ The Atlas Car & Mfg. Co., 1120 Ivanhoe road, Cleveland, has 3 ETF fork trucks with tilting mechanism of nonjamming type, operating continuously in either direction by



crank motion. Hoist carriage has centrifugal lowering brake and safety lowering ratchet. Power is from 24 to 28-cell Edison C8 36 volts batteries or gas-electric unit. Travel speed without load is 4¾ miles per hour, with 5000-pound load 4 miles per hour and with 6000-pound load 3¾ miles per hour. Hoisting speed without load is 24 feet per minute, with 5000-pound load 13 feet per minute and with 6000-pound load 12 feet per minute. Lowering speed is 30 feet per minute.

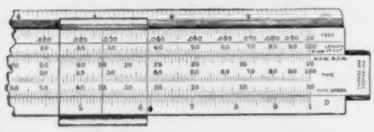
Cable and Drum Hoist

■ Conco Engineering Works division of H. D. Conkey & Co., Mendota, Ill., has announced a cable and drum type electric hoist with double

drum construction for trolley, hook or lug suspension in capacities from 250 to 1000 pounds. Mechanism is fully enclosed in oil tight, weather proof, dust proof housing finished in blueslate gray baked Wrinklelac, and has two gear reductions—one worm gear and one spur gear. Drums are 30 times cable diameter. All cables have minimum factor of safety of eight. Load is centered and held in balance.

Industrial Slide Rule

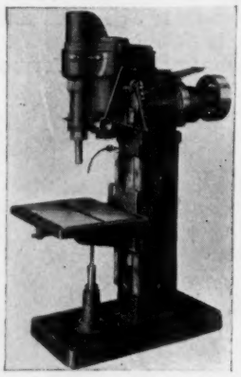
■ Eugene Dietzgen Co., 2425 Sheffield avenue, Chicago, offers Langsner industrial slide rule reqciring only one setting of slide in most cases. Face has six scales—two above slide show feed, length of cut



and diameter; three on slide represent revolutions per minute, time and cutting speed; regular D-scale is below slide. B, CI and C-scales for standard slide-rule calculations are below slide. Unit is 10 inches long, engine-divided on white celluloid and has glass "frameless" indicator.

Tapping Machine

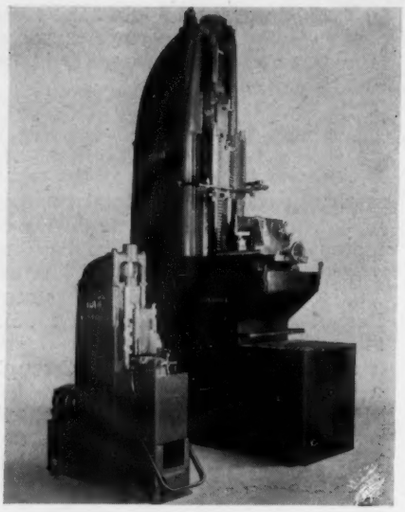
■ L. J. Kaufman Mfg. Co., Manitowoc, Wis., offers Hi-duty Tapper operating on same principle as hand tapping but with increased sensitiv-



ity as working strain is weighed to a fraction of an ounce. Having no friction adjustments tapper prevents tap breakage.

Vertical Broach

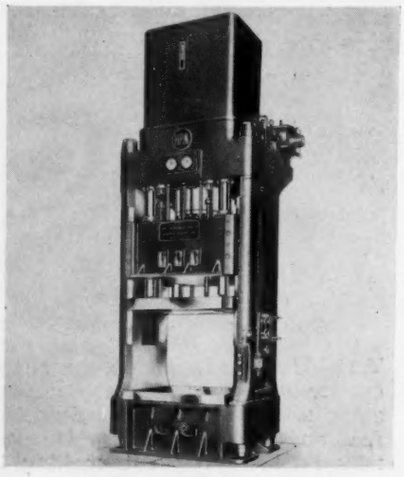
■ Cincinnati Milling Machine and Cincinnati Grinders Inc., Cincinnati, offers single ram vertical hydrobroach machines in 12 standard sizes from No. 1-18 with an 18-inch ram stroke and 2000 pounds normal broaching force to No. 15-60 with 60-inch ram stroke and 30,000 pounds force. Standard fixed-table machines are built for single cycle operation



and ram stops at end of each stroke. Either full automatic or single-cycle operation may be arranged with receding-table type machine. Both types may be stopped or reversed instantly by shifting hand levers. Chip compartments in all but the No. 1 permit removal of chips while operator works. Table returns to broaching position within 0.0003-inch. All iron castings are Meehanite.

Deep-Drawing Press

■ The Hydraulic Press Mfg. Co., Mount Gilead, O., has developed H-P-M Fastraverse triple action press for deep-drawing of sheet metal having pressure capacity of 425 tons on main ram for single-action service, 300 tons on main ram for drawing service, 150 tons on blankholder and 50 tons on die cushion. Pressing areas are 60 x 60 inches for main slide, 60 x 60 inches for overall blankholder slide with center opening of 35 x 35 inches and 35 x 35 inches for die cushion. Main draw punch, blankholder ring and die bottom of regulation drawing die are separate hydraulic actions controlled independently of each other.



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8858

NEW METAL PRODUCTS

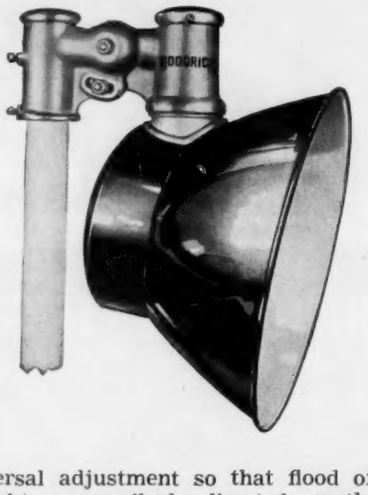
■ Residential and commercial stokers announced by Link-Belt Co., Chicago, have air supply automatically controlled to compensate for changing combustion. Air duct and coal tube are combined into a single tube. Sectional tuyeres permit expansion and contraction without cracking. Louvres for air intake are located in back panel. There is no shear pin on drive shaft and an automatic load signal is provided. Smoke-back is prevented without use of external pipes. Transmission compartment and inside of hopper are sprayed

with rust-resisting compound. Stokers come in two shades of maroon trimmed with chromium and black.

■ A power shovel which can be converted for use as a dragline, clamshell or crane has been developed by Bucyrus-Erie Co., South Milwaukee, Wis. Of two-cubic-yard capacity, machine is available with gasoline, diesel or electric power. Machine has new type chain crowd which provides powerful crowd-out and high speed retract. Crowd, hoist and swing are synchronized to give maximum output. Dipper has short back and

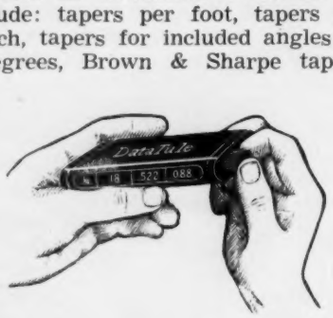
curved door with teeth made of forged tool steel which are reversible and replaceable.

■ A floodlight designed to give a higher degree of light projection as well as assuring a wide spread of light has been announced by Goodrich Electric Co., 2935 North Oakley avenue, Chicago. Fixture may be pole-mounted or attached to walls or other flat surfaces by means of a bracket arm which provides uni-



versal adjustment so that flood of light may easily be directed exactly where needed. Floodlight is finished in permanent porcelain enamel which is easily cleaned and which retains its consistently high factor of reflection.

■ To help in quickly locating data, DataTule Co., 522 Fiske building, Boston, offers tables wound on rolls in hand sized aluminum case. Tables found in mechanics DataTule include: tapers per foot, tapers per inch, tapers for included angles by degrees, Brown & Sharpe tapers,



Morse tapers, standard pipe tapers, Standard taper pins, Jarno tapers, explanation of "ratio," standard pipe threads, US standard threads, Acme standard 29 degree, size of round stock necessary to make hexagons and squares and decimal equivalents. Case has two windows (one row of figures being visible at each window) and can be furnished with unsealed end and special blank white paper on which special data can be typewritten. Both sides of paper can be used.

■ Yawman & Erbe Mfg. Co., Rochester, N. Y., offers steel efficiency desks with pressure-cemented molded linoleum top and skid-type base which may be adjusted for floor

irregularities. Top has continuous, rounded metal molding. Drawers coast out full length. Base design allows additional knee and foot space.

■ A 10-pint inbuilt liquid soap container is a feature of the vitreous china lavatory introduced by Crane Co., 836 South Michigan avenue, Chicago. Container is under slab and is filled through top of soap valve. Lavatory, known as "Norwich," has self-closing, push-button, liquid soap dispenser and Rival metal spout supply and waste fixture. Unit is available with either concealed hangers or pedestal leg

and hanger. Lavatory is 20 x 18 inches and basin is 14 x 11 inches. Back is six inches high.

■ An electric roaster, the Automeal, with an inspection glass in the lid, is announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Glass is heatproof, easily removed for cleaning, and will not collect steam. Lid holder is attached to each handle so lid may be supported in side or lengthwise positions, and is placed to collect condensed moisture of lid. Steel rack raises or lowers all dishes at once and serves as baking trivet. Temperature control is calibrated.

Welds To Be Carburized

(*Concluded from Page* 61)

maximum hypereutectoid case of from 0.005 to 0.010 inches with 0.040 to 0.050 inches of eutectoid zone with an eutectoid region of only 0.035 inches.

There was no measurable difference between the peened and unpeened specimens in the formation of a hypereutectoid zone or in the presence of sharply defined boundaries.

Considerable grain coarsening occurred in the weld metal at high carburizing temperature. Refinement was not secured with the single quench, as illustrated by Fig. 5. For maximum core toughness, a double quench is recommended to secure full refinement in core of weld metal and parent metal if its composition is such as to permit grain coarsening at the high carburizing temperatures.

Results of these tests may be used directly for other than SAE 2315 parent metal by making allowances for the difference in carbon content, rates of carbon diffusion, grain coarsening characteristics, etc.

Select Weld Rod

A weld rod should be selected such as to produce the least variation in case and core structure and hardness between the weld and parent metal.

The coating should be of a composition which will minimize the introduction of dissolved gases, particularly oxygen and nitrogen. As verified by numerous experimenters, peening has no marked effect upon welds.

Selection of the carburizing process should enable the weld to be soaked at carburizing temperatures (without contacting the carburizing medium) in order to diffuse the hypereutectoid zone. A gaseous carburizing process is ideal for this purpose.

Carburizing temperature and heat treatment will depend upon the selection of the parent and weld metal. Details will be governed by the well known principles applicable to all carburizing processes.

Book Presents Theories On Thermoelasticity

■ *Elasticity — Structure, Strength and Chemical Action—Part III,* by Dr. C. A. P. Turner; 284 pages, 8½ x 11 inches; mimeographed pages in fabricoid binder; published by the author; supplied by STEEL, Cleveland, for $5, in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S. W. 1.

This treatise, which by necessity is highly complex, presents the product of 50 years study by the author of thermoelasticity. Its purpose is to explain the formation of the elements from ether, heat vibration, gravity and electrical energy, the mechanics of chemical combination, and co-ordinates the properties of materials of construction. Utility of this work, according to the author, lies in proving the manner in which the molecular kernel splits up or may split up in chemical combination and the rules governing it.

It is shown that iron, instead of being a homogeneous element, is of triunal nature, being made up of an atmosphere of pulsation, argon; and atmosphere of vibration, N_2O; and solid spherical atoms. Gravity as the chief phenomenon of nature is explained. It is stated that not only can the properties of the elements be co-ordinated thereby, but their atomic weights, numbers and heat of formation are intimately related thereto.

Pages 1-146 constitute a physical section and pages 147-240 a chemical section, and separate indexes are carried for the two. Much of the physical section is devoted to the development of 33 propositions.

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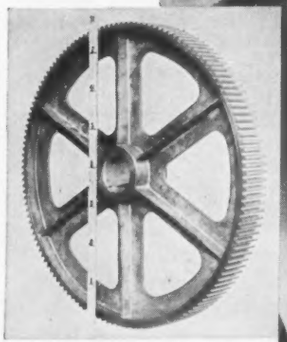
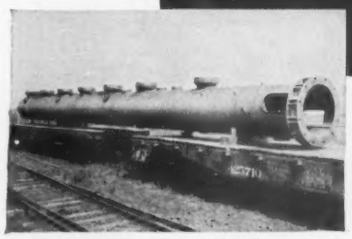


1 High speed deposition saves time in producing large gears. *Photo: Lakeside Bridge & Steel Co., Milwaukee, Wis.*

2 Ample physical properties for welds in heavy duty equipment are assured by using Murex. *Photo: S. Morgan Smith Co., York, Pa.*



3 Welders prefer Murex because slag removes readily; saves cleaning time. *Photo: Ira Bushey & Sons Co., Inc., Brooklyn, N. Y.*

4 It's easier to qualify welders for pressure vessel work with Murex. *Photo: Edge Moor Iron Works, Edge Moor, Del.*

5 Ten cents per pound of weld metal were saved by Murex on one tank fabricating job. *Photo: Stearns-Roger Mfg. Co., Denver, Colo.*

Making Auto Parts

(*Concluded from Page* 44)

brass head lamp bodies is handled at rate of 1000 to 1100 per hour on a second set of automatic nickel and chromium plating lines.

On a third automatic setup hub cap covers, lamp and door moldings and similar parts are handled at rate of 950 to 1000 per hour. Here each conveyor line takes the parts through both nickel and chromium plating operations. These operations are handled all on an end loading, return-type conveyor equipped with transfer units. Since this is rather an unusual series of operations, steps and various baths involved warrant listing.

The 19 operations involved are as follows: 1, a high pressure spray cleaner of alkaline content; 2, an electro bath cleaner; 3, a more lightly loaded electro cleaner; 4, cold water rinse; 5, cyanide dip; 6, cold water rinse; 7, acid dip; 8, cold water rinse; 9, nickel plate; 10, reclaim rinse bath; 11, cold water rinse; 12, cleaning bath; 13, cold water rinse; 14, acid dip; 15, rinse bath; 16, chromium plate; 17, reclaim rinse bath; 18, cold water rinse; 19, hot water rinse.

Cap Covers of Drawn Brass

These hub cap covers are made of brass 0.015-inch thick. They are drawn in two operations before plating. The hub cap bodies used with these covers are made from steel stock 0.032-inch thick. These are first drawn, trimmed, formed and then edge rolled. This is followed by zinc plating. Next the cover is clamped to the body and letters painted in the embossed cover parts, followed by baking.

Reflectors of raw brass, after going through blanking, rough forming, trimming and final forming operations, go through an automatic silver plating line which includes the following 14 operations: 1, electro bath cleaner; 2, rinse; 3, cyanide rinse; 4, cold water rinse; 5, acid rinse; 6, cold water rinse; 7, nickel plate; 8, rinse; 9, rinse; 10, silver plate; 11, reclaim bath rinse; 12, cold water rinse; 13, hot rinse using condensed water to prevent water stains; 14, drying at 150 degrees temperature for three minutes.

Manufacture of reflectors and their finishing is all handled on overhead chain conveyors with operations grouped in one part of the plant for maximum efficiency.

It will be seen from the description of these operations that a huge volume of parts is handled with greater efficiency through a large number of operations by use of effective conveyor systems. In fact, entire overhead area in this plant is a maze of conveyors.

♦

Plating Rack Coating

■ United Chromium Inc., 51 East Forty-second street, New York, has placed on the market a new coating material for racks used in all plating processes. Known as Unitchrome Rack Coating "W," it usually is applied by dipping and then baked at 200 degrees Fahr. Multiple coats are recommended. It forms a non-porous, tightly adhering coat, is not affected by boiling liquids, alkali cleaners or plating solutions, and does not flow or crack.

Practical Volume on Art of Toolmaking

■ *Tool Making,* by C. B. Cole; cloth, 211 pages, 5½ x 8¼ inches; published by American Technical society, Chicago; supplied by STEEL, for $3.50; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W. 1.

Importance of the toolmaker is stressed in this volume, the key man in modern production manufacturing. The text is written so that the beginning toolmaker is led from the simple facts about his personal tools and the equipment which the shop provides, to the processes of the toolmaker's craft. This is done through presentation of many typical jobs as finished working drawings and the tools they represent may be made from these drawings. Information thus supplied and study of the drawings themselves will make an important contribution to the training of any toolmaker.

The author has had many years of practical experience in design and manufacture and the material in the book has decided practical value for the man seeking to increase his technical knowledge.

Open Hearth

(*Concluded from Page* 64)

mite. Ladle also is heated a red color just prior to tapping.

Since such small heats lose temperature rapidly and there is not sufficient head in the ladle to produce a cutting action on any steel which freezes in the nozzle, it is necessary to use 1½ to 2-inch nozzles. Ingots of sizes shown in Table 1 are poured. Surface conditions of ingots are as good or better than usual run of production ingots.

The furnace is equipped with indicating and recording instruments and is manually controlled. Full automatic control of air-fuel ratio, roof temperature and furnace pressure is being considered.

The recuperator installation is operated satisfactorily, and some interesting data is being obbtained concerning advisability of using such a system in larger installations.

Before attempting experimental work, a series of heats was made for comparison purposes. Results indicated definitely that physical properties of steels made here were in general comparable with those produced in mill furnaces. With this fact established, development work is being undertaken, knowing that results obtained can be applied to production shops.

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Here are the latest industrial publications reviewed for your benefit. They are yours for the asking. There is no charge or obligation. Simply fill in the convenient coupon and return.

(1)—Roll Grinding Machine

Cincinnati Milling Machine & Cincinnati Grinders Inc.—10 page illustrated bulletin No. G-427. The 36-inch, 44 inch, 50 inch and 60 inch roll grinding machines for necks and bodies of straight, concave and convex hot and cold plate mill rolls and sheet and tin mill rolls are fully described. Specifications, standard and accessory equipment are covered.

(2)—Pumps

The F. E. Myers & Bro. Co.— 84 page illustrated catalog No. IP38. This line of small and medium sized pumps includes a broad range of types. Full informaton is given on applications, specifications, design and construction details and recommended methods of installing. Engineering data is included.

(3)—Sand Blast Cabinet

Ruemelin Manufacturing Co.—Illustrated bulletin No. 20-B. A utility sand blast cabinet for cleaning small tools and parts which are cast, milled, etc., is described. Said to be inexpensive to operate and rugged in construction.

(4)—Socket Screw Chart

Parker-Kalon Corp.—Circular slide rule type chart, condensing in a form suitable for ready reference, a large amount of dimensional data on cold forged socket screws. Distribution limited to engineers, draftsmen and production officials.

(5)—All Purpose Torch

Weldit Acetylene Co.—Illustrated data sheet No. 6A-49, describing the new "Weldit" all purpose torch for welding, cutting and brazing. For use with either equal or tank pressure, with manufactured or natural gas. Numerous new features are fully described, and a parts list emphasizes breadth of use.

(6)—Refractories

A. P. Green Fire Brick Co.—8 page illustrated bulletin No. P-11. Describes characteristics of super duty fire brick and illustrates by means of natural color photographs the changes that occur when brick is heated to service temperatures. Test data on this refractory brick are also given.

(7)—Electric Hoist

H. D. Conkey & Co.—4 page illustrated bulletin announcing the new "Torpedo" electric hoist, with capacities of from 250 to 1000 pounds. Push button control, cable and drum type and heavy construction, coupled with lug, hook or trolley type design, give this unit wide flexibility.

(8)—Elevators

Rotary Lift Co.—12 page illustrated file folder bulletin No. RE-300. "Oildraulic" elevators for lifts of 30 feet and less are low in cost to install, maintain and operate. Three types of operation are available. Full installation and operating information are given.

(9)—Steel Strapping

Acme Steel Co. — 24 page illustrated bulletin No. AD-7. Methods of using the Acme "Unit-Load" of preparing materials for shipment are described for numerous industries. Sheets, strip, angles, merchant bars and other metal products are shown prepared for shipment. Finished and semi-finished products are also shown. "Unit-Load" equipment is fully described.

(10)—Galvanizing Powder

American Solder and Flux Co. — 4 page illustrated bulletin. Outlines and describes method of galvanizing and tinning for protecting surfaces that have been welded, or that have the protective surface broken in fabrication. Simple method of application can be done in the shop or on the job.

(11)—Cutting Oil

E. F. Houghton & Co.—4-page illustrated bulletin No. 2-113. "Cut-Max Base No. 7", highly concentrated cutting oil which has higher content of active sulphur is especially suited for machining all carbon and alloy steels. Value of active sulphur is described in detail.

(12)—Valves

Crane Co.—8 page illustrated folder No. AD-1311. This bulletin on globe and gate valves includes 2 large charts that are useful in selecting the proper valves for specific duties. A section includes helpful hints on application of valves.

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HELPFUL LITERATURE

(13)—Screwdrivers and Bits

The Apex Machine & Tool Co.—12 page illustrated catalog and manual. Apex-Phillips screwdrivers and bits for electric, air and spiral drivers are covered. Tables for determining correct bit size for Phillips wood, machine and sheet metal screws and stove bolts in various styles are given. Prices are included.

(14)—A. C. Motors

Crocker-Wheeler Electric Mfg. Co. —12 page illustrated bulletin No. 251-A. Alternating current, adjustable speed, "polyspeed" motors are described. New information not previously covered includes various types of regulators available for manual, remote and automatic speed control. Installations are illustrated and described.

(15)—Insulated Conductors

Rockbestos Products Corp.—64 page illustrated loose leaf handbook-catalog No. 10-E. Illustrates and describes standard line of wire, cable and flexible cords as well as some new products. Use and applications are covered and a section on proper selection of conductor is included. Cross-indexed for reference.

(16)—Vacuum Cleaning

The Spencer Turbine Co.—20 page illustrated bulletin No. 120. Vacuum cleaning, a new development in industrial cleaning is fully covered. Floors, walls, pipes, machinery, products and ceilings are cleaned more quickly and inexpensively by this method. Installation data are given.

(17)—Industrial Equipment

Struthers-Wells—16-page illustrated catalog of "Equipment for the Process Industries". General descriptions are given of pressure vessels, rotary dryers, kilns and coolers, mixing equipment, heat exchangers, evaporators, and stainless steel and corrosion resistant equipment.

(18)—Welding Lenses

American Agile Corp.—Illustrated bulletin Supplement No. 119-A. "Agile" mirror lenses for welding increase visibility up to 42 per cent, reduce glare and eye fatigue, and protect against ultra-violet rays. Available in standard sizes and shades. Progress of the welding arc can be seen clearly through these lenses.

(19)—Drop Hammers

The Ajax Manufacturing Co.—12 page illustrated bulletin No. 120. The new "Rodrop" hammer operates without boards by means of a rigid steel rod taper-fitted in ram. Rolls fitted with durable friction materials. This forging hammer is said to be fast, flexible, powerful and inexpensive to operate.

(20)—Rust Proofing

Parker Rust Proof Co.—40 page illustrated catalog and data book on "Bonderizing." Theory and application of this process for rust proofing are covered and natural color photographs, charts and full descriptive information are included. Typical uses are shown and comparative results of panel tests are illustrated.

(21)—Insulated Conductors

General Cable Corp.—4 page illustrated bulletin "An Engineering Analysis of Super Service Cords and Cables." Describes method of vulcanizing rubber for covering of heavy duty cords and cables. Other features are covered. A sample requiring 250 pounds pull to break is included.

(22)—Recording Controller

The Foxboro Co. — 4 page illustrated bulletin No. DMF-765. Fully explains the mechanism and operating advantages of a new potentiometer indicating recording controller. Detailed explanation of construction operation and general specifications are given.

(23)—Phospher Bronze

The Riverside Metal Co.—48 page illustrated catalog on Riverside phospher bronze. Data and information are included on unusual characteristics of phospher bronze and application of this metal in a variety of alloys for industrial uses. Fundamental information and data on recent refinements and developments are covered. Characteristics of various grades, engineering data and typical uses are shown.

(24)—Stampings

Detroit Stamping Co.—8 page illustrated pocket size bulletin. Numerous types of stampings for many uses are described and illustrated. Sizes from the smallest to 46 inches long, 3 inch draw and 3/8 inch thick, of every known commercial metal and other suitable materials are covered. Holders for production parts are also described.

(25)—Diesel Engines

Worthington Pump and Machinery Corp.—8 page illustrated bulletin No. S-500-B36. The vertical four-cycle, direct-injection, totally enclosed, Type CC diesel engine developed for continuous heavy-duty loads is fully described. Specifications of several sizes and complete descriptive information are given.

(26)—Piston Rings

Koppers Co. — American Hammered Piston Ring Div.—158 page illustrated pocket size engineers' data book. Manual giving recommended types, specifications and applications of piston rings for machine designers and operators. Distribution limited to operating and designing engineers, or to executives responsible for purchase of replacements in steel plants.

(27)—Bushings and Bearings

Merriman Brothers, Inc.—16 page illustrated bulletin No. 40. "Lubrite" self-lubricating bushings and bearings in several types and for use where lubrication is difficult, immersion in water, and exposure to abrasives, dirt and weather are present. Typical installations are shown.

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"Tell Workers Real Prosperity Hope Lies in Business Revival"

(*Continued from Page* 18)

are facts that cannot be refuted, explained away, or denied. No one in this republic will deny that the masses of the people are now paying and have been paying three-fifths of all the taxes which the national government collects. Certainly the present administration will not deny that in most lines of business activity the workers of the nation receive about 80 cents out of every income dollar from employment in private business.

These two facts in themselves show that the real hope for prosperity is in the revival of business, big and little, and there is no hope for prosperity from any other source whatsoever.

The classic example of the havoc wrought by the governmental policies now in force in this country is that of ancient Rome.

When Rome was a republic, with a government similar in many ways to that of the United States, discontented pressure groups began electing senators pledged to give more relief to the unemployed and who would favor the trade guilds, which were very powerful in Rome during the last days of the republic. Under these conditions, prices kept going up, unemployment increased and the trade guilds eventually obtained a monopoly of all jobs. As their wages went up and up, unemployment increased. Inflation came about and reached such proportions that money became practically worthless—gold practically disappeared from circulation as it was so precious. At one time, oyster shells were used as money.

"Abundnt Life" Not New

All of these measures, which led to the ultimate destruction of Rome, were of course offered in the name of suffering humanity, to relieve distress, and to provide a more abundant life, by the boys who were "going to do something about it."

They were the so-called progressives and liberals of the Roman era, just as their successors of the modern age are called the progressives and liberals of today.

These were the conditions that caused the fall of the republic. These minority groups ushered in the parade of the dictators, Sulla, Pompey, and Crassus, who in turn gave way to the Caesars. The dictators, during their terms of office, it is true, managed to straighten out to some extent the evils and distresses brought on by these minority groups, but under the Roman Empire the same thing occurred again.

The policies which I have criticized in this country—that is, of attacking and harassing business and preventing its normal revival—have created every dictator in Europe.

The swiftness with which policies are promulgated and in the face of criticism, altered and changed but never abandoned, induces a goodly proportion of our people to think that all proposed action is progress. Sometimes it is, but many economic crimes are committed in the name of progress because the experience of the past is disregarded, because the remedies, while temporarily beneficial, end up worse than the disease.

History Repeats Itself

The present national administration is literally filled with the counterparts of those who wielded power in Ancient Rome. These men preach democracy and free enterprise, while they set in motion the machinery to destroy it.

Frequently, they abuse the governments of Russia, Germany or Italy, heaping criticism on these governmental systems of state control and in the next breath they advocate the measures which will imitate them. In their advocacy of economic policies, they embrace the identical systems which they in generalities frequently condemn.

They proclaim that the American system of government under which we live, and which has brought us to the highest standard of living in all the world's history, is in truth a great failure and must be replaced by systems that have proven over and over again to be a sure means of ruin.

They profess a belief in democracy, while attempting to get control of an independent branch of the government, the Supreme Court; by attempting to drive out of public life, by the use of federal funds and federal power, the men who dare to disagree with them and dare to fight for the preservation of the institutions of this country.

These are the men who disregard over and over again the fact that the working man, rather than the well-to-do, has been paying and will continue to pay over half of the tax revenues of the nation; that it is the working man and not the well-to-do who receives approximately 80 cents out of the business income dollar.

I suggest to you gentlemen that you help carry these eternal truths to those with whom you are associated in business. Put the government charts on the wall, about the pay and the taxes of the masses of the people, and you will begin to get a response, because the American working man and woman are sound at heart when they are in possession of the facts.

Some high authorities look with apparent scorn on the lack of confidence among business men in the present state of affairs. They think recurring deficits, continual tirades against business leaders, changing tax structures and countless innovations of government are no impediments to a business revival. This point of view is so juvenile that it is unworthy of refutation.

No sensible man is inclined to take risks, to enlarge his plant, to replace outmoded equipment, to lay in a stock of goods beyond day to day needs, when he cannot even remotely guess what new experiment touching his business, what new tax, what new lavish and wasteful governmental expenditures are to be inflicted today or tomorrow.

In spite of the inspired derision there is to the lack of business confidence, if fear is banished and a genuine respect and confidence for and in governmental policy is restored, it is the one thing that will provide more jobs than all the relief appropriations will provide from now until doomsday.

Program Is Proposed

I suggest the following as a partial program to restore confidence and to create new employment for the idle, in private business.

First, reorganize the federal government to accomplish not alone efficiency but real and general economy. Let me point out one item to illustrate. Many millions can be saved in all departments by dropping the press agents and propaganda and other activities which are costly, and more political than anything else.

Second, eliminate more than a score of borrowing corporations and agencies of the federal government and let the United States treasury borrow as needed for all the federal government. Then our national obligations may be a part of our national government business statement. Today, many agencies are borrowing billions of dollars which the government really owes but which are not carried as a part of the government's obligation. An example of this is the U. S. Housing Authority which has so borrowed $800,000,000 and is now about to borrow $800,000,000 more.

Third, have a thoroughly honest purge of the welfare rolls, and base relief on real need, coupled with a

requirement that localities bear a definite portion of the burden so that local interests may be aroused and demand elimination of the frequent abuses.

Fourth, whatever monies it is necessary to appropriate for the welfare of our people, have a tax program that raises sufficient revenue to at least approximate the staggering appropriations and recurring deficits of the present day. This can be done by broadening the income tax base so that each citizen in the nation, according to his ability to pay, carries a part of the national tax burden. We must wipe out the deficits or at least reduce them to understandable proportions.

Recognize Employer's Rights

Fifth, overhaul the Wagner labor act, by giving the employer the right to the free speech guaranteed by the constitution and the right to speak out and to act when he believes that influences are attempting, not to help but to exploit those who work with him.

Sixth, revise the social security act. Eliminate the intended accumulation of reserve invested only in the national debt. Place it on more of a pay as you go basis. It is full of inequalities. At present the farmer gets no direct benefit from it, yet he pays his share of security taxes just the same, for the employers' social security taxes are passed on in increased prices to this large group of our citizens.

Seventh, remove the expenditure of public funds from one man domination, where too often political considerations rather than the public welfare dictate where and how it shall be spent, as was the case in the building of bridges in Maryland during the last campaign.

Eighth, keep the three branches of our government, executive, legislative and judicial, independent of each other, by resisting encroachments of any one upon the other two.

I believe that the accomplishment of these things will, more than any others, restore needed confidence and put our country on the road to better times. It may be that there are a score of important things to do in order to revive the business of the nation. But do each and every one of them and fail at the same time to restore confidence in government and they will not avail to accomplish the recovery intended. Without confidence there can be and will be no real business revival.

Finally, let me repeat: Let the 50 million workers of this nation employed in private business know, through information and education, that theirs is the biggest stake of all in a revived business; that the present state of affairs demands that business in every form, big and little, should be encouraged, not discouraged; helped, not hindered; supported, not attacked; for with the coming of confidence and the revival of business there is work for the unemployed at good wages and steady hours, a better market and better prices for the farmer, a decrease in the governmental burden of taxation and a normal way of American life.

We are rapidly approaching a decisive moment in our national history. The men who love America cannot be content to stand on the side lines. The facts which I have attempted to present here tonight should be represented in understandable form to the scores of millions who work every day in private business for a living. The time to commence is now. America's past, by comparison with that of any other nation, is the greatest of them all, and her future will be the greatest of them all if there in positions of leadership, in and outside of government, stand by the eternal truths of history and carry the facts about the present day to the millions of our fellow citizens.

Mill Supply Groups Denounce Reciprocity

(Concluded from Page 20)

son & Sons Co., New Haven, Conn.; first vice president, H. K. Clark, Norton Co., Worcester, Mass.; second vice president, R. G. Thompson, Lufkin Rule Co., New York. Horace Armstrong, Armstrong Bros. Tool Co., Chicago, was re-elected treasurer; and R. Kennedy Hanson, Pittsburgh, re-elected secretary-manager. Executive committee: C. O. Drayton, American Screw Co., Providence, R. I., chairman; D. W. McAllen,SKF Industries, Philadelphia; H. G. Morrow, Central Tube Co., Pittsburgh; G. E. Dresser, Carborundum Co., Niagara Falls; H. P. Ladds, National Screw & Mfg. Co., Cleveland; and A. A. Murfey, Cleveland File Co.

National Supply and Machinery Distributors' association elected: President, Charles E. Curtis, Western Iron Stores Co., Milwaukee; first vice president, A. R. Smith, Boyer-Campbell Co., Detroit; second vice president, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver; executive committee, representing area No. 1, F. Marsena Butts, Butts & Ordway, Cambridge, Mass.; area No. 3, Tyler M. Carlisle, Strong, Carlisle & Hammond, Cleveland; area No. 4, Samuel H. Clark, Samuel Harris & Co., Chicago; and area No. 6, A. J. Glessner, A. J. Glessner Co., San Francisco. Members of the committee representing other areas were re-elected. George A. Fernley, Philadelphia, was continued as advisory secretary, and Henry R. Rinehart, Philadelphia, as secretary-treasurer.

Southern Supply and Machinery Distributors' association elected: President, Edward F. Stauss, Oliver H. Van Horn Co. Inc., New Orleans; first vice president, J. M. Bates, Moore-Hanley Hardware Co., Birmingham, Ala.; second vice president, J. B. Crimmins, Mills & Lupton Supply Co., Chattanooga, Tenn. Executive committee: Jack B. Dale, Briggs-Weaver Machinery Co., Dallas, Tex.; Robert S. Page, Henry Walke Co. Inc., Norfolk, Va.; C. .E Lilley, Superior-Sterling Co., Bluefield, W. Va., and H. M. Schramm, Turner Supply Co., Mobile, Ala. Mr. Smith was re-elected secretary-treasurer.

Dallas, Tex., was selected for the 1940 convention, the time to be announced later.

Obsolete Steel Plants Give Way to Modern Mills

■ Abandoned or dismantled since 1926 have been 173 blast furnaces, 39 plants for producing steel ingots, and 144 plants making finished products. This is disclosed in reports furnished by steel companies to the American Iron and Steel institute.

Total number of employes in the industry, however, increased sharply during the period. A new peak was established in 1937, while the total number currently at work is still substantially higher than in 1926.

Nearly all the plants which were abandoned or scrapped had been rendered obsolete or inefficient by improved production technology. Fewer than a dozen were abandoned as a direct result of mergers or consolidations.

Any decline in productive capacity from the abandonment of obsolete plants has been more than offset by construction of new and more efficient plants, and by modernization of existing facilities. Thus present capacity for producing steel is 30 per cent greater than in 1926, while pig iron capacity is substantially the same.

Between 1926 and 1938, 14 new blast furnaces were built, their capacity averaging 2½ times that of furnaces abandoned during the period. Constructed since 1926 were 12 new steel ingot plants and 42 new plants for producing finished steel.

■ Malleable iron castings production in April totaled 31,640 net tons, compared with 39,615 tons in March.

Steel Production Increases Further

Output Expands Faster Than Consumption; Shapes Active

MARKET IN TABLOID ★

Demand
Up slightly; heavy products have better outlook.

Prices
Fairly steady despite occasional shading.

Production
52 per cent, best in eight weeks; pig iron drops.

■ STEEL demand is slightly more active but by a smaller amount than is indicated by the sharp rise in ingot production the past two weeks.

Operations rose 4 points last week to 52 per cent, best rate in eight weeks and comparing with 25½ per cent a year ago.

Several factors, mostly seasonal, will prevent consumption the next 30 days from matching the recent trend of steelmaking. Nevertheless, the industry is more hopeful that gradual betterment will prevail in business during the second half.

Automobile builders will require only small steel tonnages for a number of weeks; some farm equipment plants have scheduled shutdowns later this month until after July 4; railroad needs are likely to continue restricted for the near future, and requirements of some other consumers usually moderate seasonally at this period.

Meanwhile, steelmaking will receive strong support from mill backlogs of sheets and strip acquired a few weeks ago. In some instances releases of this tonnage are heavier than expected, although automotive companies naturally prefer to postpone receipt of most of the material they have on order until later in the year when assembly of new models will be expanding.

Possibility of heavy operations of sheet and strip mills the next few months is seen in stated intentions of some producers to clear books of their low-price business as soon as possible. However, it is questionable whether all tonnage will be shipped by the end of third quarter, particularly automotive steel.

Holiday And Strike Cut Auto Assemblies Sharply

Motorcar assemblies dropped sharply last week, the result of holiday shutdowns and the Briggs strike. Output of only 32,445 units was a decline of more than 35,000 but compares with 26,980 a year ago. Chrysler built 1100 units against 5650 the week before; Ford slipped from 20,350 to 1600, General Motors from 31,600 to 23,670 and all others from 10,060 to 6075. Partial recovery is indicated for this week, the extent depending on the labor situation. The latter also will influence new model preparations.

Daily average pig iron production in May was down 19.2 per cent from April but 37.2 per cent larger than a year ago. Last month's output was restricted by the banking of furnaces to conserve fuel during the coal mining tieup. Many of these stacks since have resumed. At the end of May, 107 blast furnaces were active, against 102 April 30. Total pig iron production in May was 1,716,544 tons, compared with 2,055,326 tons in April and 1,260,937 tons a year ago. Output the first five months of 10,400,731 tons was 51.4 per cent ahead of the 1938 period.

Pig iron prices have been reaffirmed for third quarter. Finished steel quotations generally are steady, despite occasional shading on certain products.

Construction, Ship Work Aid Plates, Structurals

Recent developments in heavy steel markets are favorable. The navy has placed eight destroyers and eight submarines requiring 9500 tons of steel, and 30,000 tons will be required for 12 merchant ships on which the maritime commission is expected to ask bids shortly. Structural shapes and concrete reinforcing bars are more active. Last week's awards of the former were among the heaviest so far this year, more than 33,000 tons alone being involved in seven orders.

Railroad equipment markets are enlivened slightly by an inquiry from the Western Maryland for 1110 freight cars. Pending freight car business otherwise is light, while mill backlogs of track material gradually are declining.

Most districts shared in last week's rise in steelmaking. Gains included 6 points to 42 per cent at Pittsburgh, 4½ points to 53½ at Chicago, 11 points to 70 at Wheeling, 2 points to 44 at Buffalo, 3 points to 60 at Birmingham, 8 points to 60 at Cincinnati and 3 points to 48 at Youngstown. New England was off 10 points to 35. Cleveland was down 1 to 53 and St. Louis declined 1½ points to 37½. Eastern Pennsylvania at 37 per cent and Detroit at 57 were unchanged.

Scrap is stronger in a number of districts, but buying has yet to follow the upturn in consumption and the price composite is unchanged at $14. The finished steel composite holds at $55.70.

COMPOSITE MARKET AVERAGES

	June 3	May 27	May 20	One Month Ago May, 1939	Three Months Ago March, 1939	One Year Ago June, 1938	Five Years Ago June, 1934
Iron and Steel	$35.59	$35.63	$35.63	$35.80	$36.40	$38.41	$32.96
Finished Steel	55.70	55.70	55.70	56.00	56.50	61.55	55.08
Steelworks Scrap..	14.00	14.00	13.96	14.05	14.98	10.89	10.32

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 3, 1939	May 1939	March 1939	June 1938
Steel bars, Pittsburgh	2.15c	2.20c	2.25c	2.45c
Steel bars, Chicago	2.15	2.20	2.25	2.40
Steel bars, Philadelphia	2.47	2.52	2.57	2.47
Iron bars, Terre Haute, Ind.	2.05	2.10	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.21½	2.21½	2.40¼
Shapes, Chicago	2.10	2.10	2.10	2.25
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.371
Plates, Chicago	2.10	2.10	2.10	2.25
Sheets, hot-rolled, Pittsburgh	2.00	2.05	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.05	3.10	3.20	3.45
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.75
Sheets, hot-rolled, Gary	2.00	2.03	2.15	2.40
Sheets, cold-rolled, Gary	3.05	3.08	3.20	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.80
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	June 3, 1939	May 1939	March 1939	June 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.34
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.34
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.33	85.33	85.27	107.77

Scrap

Heavy melting steel, Pittsburgh	$14.25	$14.55	$15.75	$11.40
Heavy melt. steel, No. 2, E. Pa.	12.75	12.75	13.40	9.90
Heavy melting steel, Chicago	12.75	12.75	14.25	10.25
Rails for rolling, Chicago	17.25	17.25	17.25	14.90
Railroad steel specialties, Chicago	14.75	14.75	16.25	13.50

Coke

Connellsville, furnace, ovens	$3.75	$3.75	$3.75	$3.90
Connellsville, foundry, ovens	5.00	5.00	5.00	5.05
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.00c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(*Base, 3 to 20 tons*)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(*Base, 15 to 50 tons*)

Pittsburgh	2.00c
Chicago or Gary	2.00c
Detroit, delivered	2.10c
Cleveland	2.00c

Buffalo	2.00c
Birmingham	2.00c
Gulf ports	2.35c
Pacific Coast points	2.60c

Iron

Chicago, Terre Haute	2.05c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	1.90-2.05c
Detroit, delivered	2.00-2.15c
Gulf ports	2.25-2.40c
Pacific coast ports	2.50c
Philadelphia, del.	2.07-2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	1.75-1.90c
Detroit, delivered	1.85-2.00c
Gulf ports	2.10-2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45
(Per pound)	
Polished staples	3.15c
Galv. fence staples	3.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.80; two-point cattle, 80-rod spool	$2.62
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carloads, Pittsburgh.....$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

Alloy	S.A.E.	Diff.	Alloy	S.A.E.	Diff.
	2000	0.35		3100	0.70
	2100	0.75		3200	1.35
	2300	1.55		3300	3.80
	2500	2.25		3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot-rolled, 1 to 20 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve.,	Pitts.
0.26—0.50		2.80c
0.51—0.75		4.30c
0.76—1.00		6.15c
Over 1.00		8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞—1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller 67.5 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	70.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Terre Haute, del.	10.00
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$22.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	17.00-18.00
Do. barge	18.00-19.00
No. 2 lump	18.00-19.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00; Do., del. Pittsburgh 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00. Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00; 2% carbon, 93.00; 1%, 103.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25

20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40

Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do, less-ton lots 2.30

Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c

Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.00; Do, smaller lots 2.10

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do, 2% 12.50c

Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c; Ton lots 5.00c; Less-ton lots 5.25c

Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c

Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.88	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.61
New York (Metropolitan)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.43
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	....	3.85	3.85	5.20	3.90	....	5.40
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.40
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	4.45	4.50
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.55	4.62
Detroit	3.33	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.59
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	....	4.57
Chicago	3.50	3.75	3.75	3.55	3.55	5.15	3.35	4.30	4.25
Minneapolis-St. Paul	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	4.50
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	3.32	4.53
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.54	4.64	4.64	4.41	4.41	6.01	4.32	....	5.29
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	3.65	3.85	5.20	3.40	3.50	5.25	3.70	....	4.75
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	4.75
San Francisco	3.50	3.90	6.00	3.45	3.45	5.05	3.45	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.46	4.13	4.18	7.50	6.05	5.80	7.90	8.63	7.23
New York	3.51	4.09	4.14	7.50	6.10	5.85	..	8.69	7.29
Philadelphia	3.66	4.06	3.85	7.31	5.86	5.61	8.56	....	....
Baltimore	....	4.10	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.20	....	....	....	....	....	....	....
Buffalo	3.42	3.75	3.75	7.10	5.65	5.40	8.50	8.15	6.75
Pittsburgh	3.35	3.65	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.20	3.75	3.30	7.30	5.85	5.85	7.70	8.15	6.75
Detroit	3.40	3.80	3.38	7.42	5.97	5.72	7.19	8.45	7.05
Cincinnati	3.45	4.00	3.65	7.44	5.99	5.74	8.84	8.50	7.10
Chicago	3.65	3.75	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.34	3.90	7.45	6.00	8.59	9.19	8.84	7.44
Milwaukee	....	3.93	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.02	3.92	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	....	4.30	....	....	....	....	....	....	....
Memphis	....	4.31	....	....	....	....	....	....	....
Chattanooga	....	4.44	....	....	....	....	....	....	....
Tulsa, Okla.	....	4.79	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.48	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.00	4.65	9.40	8.55	8.40	9.05	10.40	8.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, June 1

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$18.32	2 3 0
Basic bessemer	....	17.15	2 0 3
Hematite, Phos. .03-.05	26.91 5 15 0*	.....	.....
Billets	$34.52 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.24 11 7 6	42.60	5 0 0
Standard rails	$44 46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.95c to 1.98c	5 2 6 to 5 4 0
Structural shapes	2.09c 10 0 0	1.76c to 1.85c	4 12 6 to 4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm	2.72c 13 0 0	2.95c	7 15 0°
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.52c	9 5 0
Bands and strips	2.77c 13 5 0	1.95c to 2.00c	5 2 6 to 5 5 0
Plain wire, base	4.08c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	.....	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17	4 19 0(a)	$16.61	626.75	$17.00	500	$25.28	63
Basic bess. pig iron	21.65	4 12 6(a)	.....	.....	.....	...	27.89 (b)	69.50
Furnace coke	5.38	1 4 2	5.96	225	6.87	202	7.62	19
Billets	34.52	7 7 6	25.04	945	29.24	860	38.73	96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c	132
Merchant bars	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c	110
Structural shapes	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c	127
Sheets, black	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c	17 5 0	3.30c	2,750	4.13c	2,750	6.66c	370
Plain wire	4.08c	19 10 0	1.74c	1,450	2.48c	1,650	3.11c	173
Bands and strips	2.58c	12 7 0††	1.61c	1,340	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, No. 1, R. R.	13.50-14.00
Buffalo, No. 1	13.00-13.50
Buffalo, No. 2	11.00-11.50
Chicago, No. 1	12.50-13.00
Chicago, auto, no alloy	11.25-11.75
Chicago, No. 2 auto	10.50-11.00
Cincinnati, dealers	10.50-11.00
Cleveland, No. 1	13.75-14.25
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	9.00- 9.50
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	11.50-12.00
Granite City, R. R.	11.50-12.00
Granite City, No. 2	10.50-11.00
Los Angeles, No. 1	13.00-14.00
Los Angeles, No. 2	12.00-13.00
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	15.50-16.00
Pittsburgh, No. 1	14.00-14.50
Pittsburgh, No. 2	12.50-13.00
St. Louis, R. R.	12.00-12.50
St. Louis, No. 2	10.50-11.00
San Francisco, No. 1	13.00-13.50
Seattle, No. 1	11.00-12.00
Toronto, dlrs. No. 1	9.25- 9.75
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	11.00-11.50
Chicago, factory	12.00-12.50
Chicago, dealers	10.75-11.25
Cincinnati dealers	10.00-10.50
Cleveland	13.75-14.25
Detroit	10.25-10.75
E. Pa., new mat.	15.00-15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	14.00-14.50
Pittsburgh	14.00-14.50
St. Louis	9.50-10.00
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	10.00-10.50
Cleveland	9.50-10.00
Los Angeles	14.00
Pittsburgh	12.50-13.00
St. Louis	7.00- 7.50
Toronto, dealers	8.00- 8.50

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati, dealers	6.00- 6.50
Detroit	7.00- 7.50
†Los Angeles	3.75- 4.00
St. Louis	6.00- 6.50
Toronto, dealers	4.25- 4.75

BUSHELING

Buffalo, No. 1	11.00-11.50
Chicago, No. 1	11.25-11.75
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	1.75- 2.25
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	9.50-10.00
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	3.75- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.00- 6.50
Chicago	6.50- 7.00
Cincinnati, dealers	4.00- 4.50
Cleveland	7.00- 7.50
Detroit	4.25- 4.75
Eastern Pa.	8.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	8.00- 8.50
St. Louis	3.50- 4.00
Toronto, dealers	4.25- 4.75
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.25- 7.75
Cleveland	7.50- 8.00
Chicago	7.50- 8.00
Detroit	5.25- 5.75
Pitts., alloy-free	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	6.75- 7.25
Cincinnati, dealers	2.75- 3.25
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	4.75- 5.25
New York	†2.50- 3.00
Pittsburgh	6.50- 7.00
Toronto, dealers	3.50- 4.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	12.50-13.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	4.00- 4.25

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†4.50
Buffalo	6.75- 7.25
Chicago	6.25- 6.75
Cincinnati, dealers	2.75- 3.25
Cleveland	7.50- 8.00
Detroit	4.75- 5.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.75- 4.25

RAILROAD SPECIALTIES

Chicago	14.50-15.00

ANGLE BARS—STEEL

Chicago	15.00-15.50
St. Louis	13.00-13.50

SPRINGS

Buffalo	15.50-16.00
Chicago, coil	15.50-16.00
Chicago, leaf	14.50-15.00
Eastern Pa.	17.00-17.50
Pittsburgh	17.00-17.50
St. Louis	14.00-14.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	16.50-17.00
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, dealers	16.25-16.75
Detroit	16.00-16.50
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	17.00-17.50
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	15.50-16.00
Chicago	13.00-13.50
Cleveland	16.00-16.50
Pittsburgh	15.50-16.00
St. Louis	13.00-13.50
Seattle	16.00

FROGS, SWITCHES

Chicago	12.50-13.00
St. Louis, cut	13.00-13.50

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	7.50- 8.00
Cincinnati, dealers	6.00- 6.50

RAILROAD GRATE BARS

Buffalo	9.00- 9.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.75- 6.25
Eastern Pa.	12.50
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.00-16.50
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	11.50-12.00

FORGE FLASHINGS

Boston district	†7.50
Buffalo	11.00-11.50
Cleveland	11.00-11.50
Detroit	8.50- 9.00
Los Angeles	9.00
Pittsburgh	12.50-13.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Cleveland, crops	17.50-18.00
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.00-18.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Eastern Pa., crops	17.50-18.00
Pittsburgh	17.00-17.50
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Boston district	†14.50
Chicago, net	17.50-18.00
Eastern Pa.	20.50-21.00
St. Louis	17.00-17.50

LOCOMOTIVE TIRES

Chicago (cut)	15.00-15.50
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.25-15.50
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	15.50-16.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†10.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.00-13.50
Chicago, rolled steel	14.25-14.75
Cincin., iron, deal.	12.00-12.50
Eastern Pa., iron	15.50-16.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	17.00-17.50
St. Louis, iron	14.00-14.50
St. Louis, iron	14.00-14.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	13.00-13.50
Buffalo, mach.	14.00-14.50
Chicago, agri. net	9.50-10.00
Chicago, auto net	12.00-12.50
Chicago, railroad net	10.50-11.00
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	11.50-12.00
Cleveland, mach.	16.50-17.00
Detroit, cupola, net	12.50-13.00
Eastern Pa., cupola	16.00-16.50
E. Pa., mixed yard	13.50-14.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.50-15.00
Toronto, No. 1, mach., net	12.00-12.50

HEAVY CAST

Boston dist. break.	†9.50
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	12.50-13.00
Detroit, auto net	12.50-13.00
Detroit, break	9.50-10.00
Eastern Pa.	14.50-14.75
Los Ang., auto, net	13.50
New York, break	†10.50-11.00
Pittsburgh, break	12.00-12.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	11.50-12.00
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.75- 6.25
Detroit, net	7.00- 7.50
Eastern Pa.	12.50
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	8.00- 8.50

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	11.50-12.50
Buffalo	13.50-14.00
Chicago, R. R.	14.50-15.00
Cincin., agri., deal.	10.25-10.75
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	15.00-15.50
St. Louis, R. R.	12.25-12.75

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	10.00-10.50
Tungsten, sh. ton unit, duty pd. nom.	19.00-19.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	29.00
So. African, 50-52% nom.	29.00
Indian, 49-50%	27.00-28.00

—The Market Week—

Sheets, Strip

Sheet and Strip Prices, Pages 82, 83

Pittsburgh—Production of flat-rolled steel is up further to slightly above 50 per cent for common and finished steel and 30 per cent for strip. Seasonal factors contribute to another small drop in galvanized operations to 54 per cent. Releases against recent bookings still are small but are increasing gradually. New business is quiet. Prices now are reported firm except in galvanized.

Cleveland—Some sheet releases are appearing for new automobile model parts, and shipments to other consumers are heavier. Possibility of congested mill schedules next quarter depends on how much pressure producers exert on buyers to take out material ordered recently at price concessions. New business in sheets and strip is light.

Boston—Sheet orders are small. Protected by moderate coverage several weeks ago, most large consumers are buying little. Jobbers in some instances are pressing for shipment of several grades. Small tank demand is slower. Sheet prices appear steadier at new levels but are not subject to much test.

New York—Shipping releases on strip tonnage booked at recent low prices are heavier, mills in most instances striving to clear this volume as soon as possible. Such business in the East was smaller than in the Mid-West. Buying is light and some scattered shading under current quotations is noted.

Sheet consumption is fair but declining, with makers of household equipment probably most active. April sales of domestic refrigerators were 20 per cent lighter than a year ago, with the four-month total 37 per cent ahead of last year.

Philadelphia—Specifications against recent bookings are heavier than expected and some smaller consumers apparently will have taken out most of their low-price tonnage by the end of June. Prices still are being scrutinized closely but it is believed new levels are maintained fairly well. In effect, however, functional allowances still are being made to jobbers on galvanized.

Buffalo — Sheet and strip production is slightly heavier as a result of releases against old orders. New buying is light, being mostly of a miscellaneous nature. Automotive shipments continue restricted.

Cincinnati—Automotive specifications fail to reflect recent heavy buying, but makers of household

UNCHANGING--
BUT PROFITS NOT REQUIRED

All of us have frequently heard of the unchanging ruggedness of the "Old Man of the Mountain." The sight of his face is impressive but

Do you realize that many industrial plants today seem to be emulating the "Great Stone Face"? They have remained practically unchanged for years and have no particular intention of doing otherwise in the immediate future. As might be expected, they are continually wondering why profits cease any longer to make their appearance.

In other words, stability is carried much too far when it is applied to the machine tools in use in many plants. Design changes have been so rapid that the manufacturer who expects to survive cannot afford to use yesterday's equipment.

For example, a large printing press manufacturer has just reported that a recently purchased Landis grinder will pay for itself in one year on the basis of full time operation. This organization is a very successful one. Do you think it would be equally so if its equipment were kept as unchanged as the "Old Man of the Mountain"? 295

LANDIS TOOL CO.
WAYNESBORO, PENNA.

"PRECISION" LANDIS GRINDERS

INVEST IN LANDIS

equipment and miscellaneous consumers are taking steady shipments. New business is light, influenced by previous coverage and by the holiday.

St. Louis — Sheet and strip buying is slow following recent heavy coverage. Galvanized roofing is more active than some other grades, but enameling stock is slower in both new orders and shipments.

The C. T. Hill organization has been incorporated as the Pacific Railway Equipment Co., Slauson and Eastern avenues, Los Angeles.

Plates

Plate Prices, Page 82

Cleveland — Plate business has been steady lately, May bookings comparing favorably with April. A large part of the demand has been in light gages for miscellaneous uses, with some tonnage being for structural and ship repair work. The local shops of the New York Central plans to reopen later this month.

Chicago—Some railroad plate demand for equipment repairs is appearing, while bridge and tank work is lending considerable support to the market. A recent pipe line project booked by a local interest will require nearly 1000 tons of plates.

Boston — Plate buying is light. Prices are somewhat steadier but shading has not entirely disappeared. This takes the form of waiving of some extras and indirect concessions rather than outright cutting. Shipyard releases are steady, contracts including 900 tons for a siphon, Chelsea Creek, Boston. Fabricating shop demand is slack.

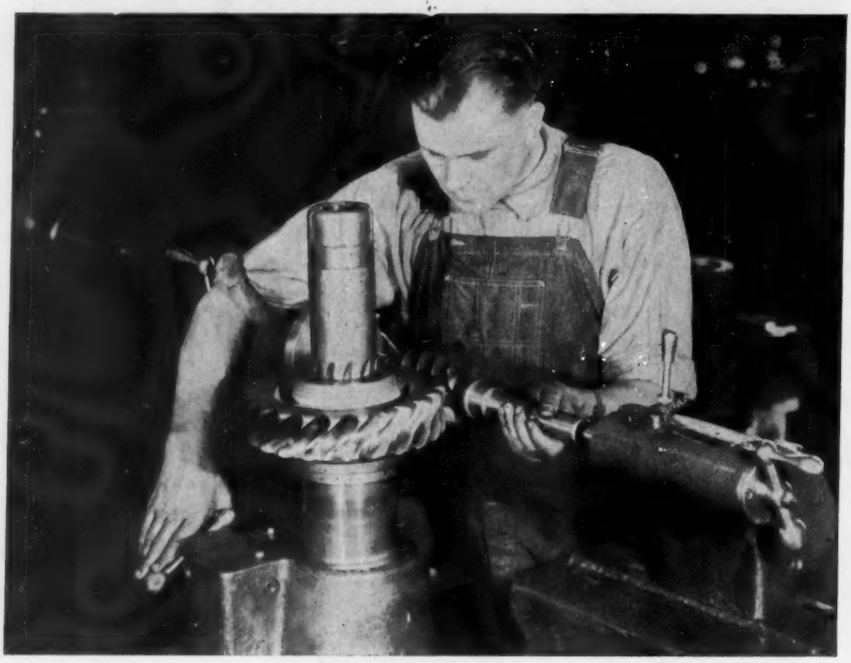
New York — Plates are fairly steady at 2.29c, delivered, but are receiving little test. In view of recent buying at price concessions, sellers look for quiet business during June. A possible exception is ship tonnage, in view of the placing by the navy of eight destroyers and eight submarines. These involve about 9500 tons of steel, mostly plates. Railroad specifications also may be heavier with the resumption of repair work at a number of shops that were closed during the coal mining suspension. Tank and boiler work is light. The maritime commission shortly will take bids on 12 merchant ships, taking about 30,000 tons of steel, largely plates.

Philadelphia—Some skepticism is evidenced over probability of the 2.10c base on plates continuing through third quarter in view of the 2.00c price on hot-rolled sheets, but mills point out improvements in sheet manufacturing methods justify the present differential. Meanwhile, plate business continues to be taken at the 2.10c, Claymont, base, including tonnage for shipbuilding, boiler and pressure vessel fabrication and warehouses. Plate inquiry for repairs to 105 Pennsylvania railroad locomotives is awaited.

Birmingham, Ala. — Some tank and miscellaneous construction has resulted in slightly improved outlook for plates. A large volume of this business is in prospect. Plates now are among the most active of the heavier items.

Seattle — The plate market is quiet, local shops having small miscellaneous contracts involving less than 100 tons each. No important tonnages are in prospect. Reclamation bureau, Denver, plans to call bids soon for No. 2 and No. 3 spillways, Roza diversion project, tonnages unstated.

San Francisco — Little improvement is noted in demand for plates and only one project over 100 tons was reported placed. So far this year 16,655 tons have been placed,



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compared with 14,131 tons for the same period a year ago.

Plate Contracts Placed

900 tons, steel siphon, Chelsea creek, Boston, metropolitan district commission project, to Hetzel Steel Co.

410 tons, 48-inch steel water pipe, Newark, N. J., to National Tube Co., Pittsburgh.

196 tons, standpipe, Warren, O., to Warren City Tank & Boiler Co., Warren, O.

150 tons, gas holder for Hercules Powder Co., San Francisco, to Steel Tank & Pipe Co., Berkeley, Calif.

100 tons, welded barge pontoons, Washington, war department, to American Bridge Co., Pittsburgh.

Plate Contracts Pending

228 tons, penstock, Elephant Butte power plant, Rio Grande project, N. Mex., specification 1217-D; bids opened.

Bars

Bar Prices, Page 82

Pittsburgh—Carbon and alloy bar orders are slightly heavier. Shipments generally are on spot orders and for fill-in needs. New business from automotive interests is reported fairly large but is not expected to be shipped in large volume for a number of weeks. Prices are steady.

Cleveland—Bar business is well maintained, May bookings being a trifle ahead of April. Initial demand for new model automobile material is starting to appear from forgers. Requirements of farm equipment interests have improved moderately in recent weeks, operations of this group being aided by relatively small stocks of finished machines in certain sections. Bar demand from miscellaneous users is steady or up slightly.

Chicago—Merchant bar demand is substantially unchanged, with little fluctuation expected in the next few weeks. Large buyers are purchasing almost entirely for fill-in needs. Broad range of miscellaneous interests are chiefly supporting present demand. Agricultural requirements are expected to taper gradually to a low point by the end of the month.

Boston—Alloy steel bars are relatively more active than carbon stock, but both are far from brisk. Buying is spotty and generally in small lots. Consumption is down slightly. Shipbuilding and chain-making requirements are maintained, with some increase in alloy needs for the latter. Forging bars move slowly.

New York — Alloy bar specifications from government shops and airplane builders continue outstanding. Better activity at railroad shops as yet has not influenced bar demand. Small buyers are receiving the benefit of the lower base price, while the net increase of $1 a ton to larger consumers, resulting from elimination of quantity differentials, does not go into effect until July 1.

Buffalo—Bar production shows resistance to any tapering off as summer months approach. Building requirements are giving the strongest support to operations, with some output being used to augment mill stocks. No large orders have appeared yet from motor manufacturers.

Philadelphia — Warehouses are placing small orders for bars but demand generally is none too active. Forging quality material is moving fairly well, especially to shops with government orders.

Birmingham, Ala.—Bar business, composed largely of demand for concrete reinforcing, is relatively satisfactory. An active business is developing from miscellaneous projects.

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Pipe

Pipe Prices, Page 83

Pittsburgh—A moderate recovery is looked for in pipe business this month, following a slight letdown in May. Better activity is anticipated in both oil country goods and standard pipe. Railroad locomotive repairs have stimulated boiler tube demand, part of which will carry over into June. Mechanical tubing needs of the automotive industry are counted on to improve the next few weeks, May business having been scant.

Cleveland—Standard steel pipe bookings hold at the level of the past several weeks, the May total showing little change from April. Casing demand also was steady, with line pipe tonnage heavier. Cast pipe business declined, and the smaller volume of inquiries precludes any marked recovery this month.

Boston — Cast pipe buying continues to hold up well, maintaining operations at the district foundry around five days per week. The bulk of early season laying requirements have been placed. Steel pipe demand has slackened while wrought pipe is slow. Prices on both the latter through re-sellers are generally maintained except in spots in Connecticut.

New York—Cast pipe buying is confined mostly to small lots, and few large inquiries are active. Prices are slightly weaker, concessions of $2 a ton being noted.

Birmingham, Ala. — Scattered business in pipe continues to maintain production at a relatively high mark. Some tonnage has materialized from the west coast, including 775 tons divided between two producers, and Florida municipalities have taken a sizable lot in recent weeks.

Seattle — Award of 1200 tons of cast iron pipe to French interests by Yakima, Wash., featured the market last week. For the same project, 125 tons of 16-inch went to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J., valves to Rensselaer Valve Co., and hydrants to R. D. Wood & Co. N. Coluccio & Co., Seattle, is low for the Garfield street project, Seattle, calling for 700 tons of 8 to 12 inch pipe, Rensselaer low for valves.

San Francisco — Interest in cast iron pipe centers around bids just opened on 1750 tons for east bay municipal utility district, Oakland, Calif., and on 234 tons for Tucson, Ariz. No awards of size were reported placed but pending business exceeds 5400 tons. To date this year 11,254 tons have been booked, compared with 13,842 tons for the corresponding period in 1938.

Cast Pipe Placed

1200 tons, 8 to 12-inch, for Yakima, Wash., to French interests represented by Pacific Water Works Supply Co., Seattle.

500 tons, North Beach airport, New York, to Warren Foundry & Pipe Corp., Phillipsburg, N. J., through procurement division, treasury department.

160 tons, 6-inch for Spokane, Wash., to Pacific States Pipe Co., Provo, Utah.

125 tons, 16-inch, for Yakima, Wash., to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

234 tons, 2 to 8-inch, Tucson, Ariz.; bids opened.

700 tons, Garfield street improvement, Seattle; N. Coluccio & Co., Seattle, general contract.

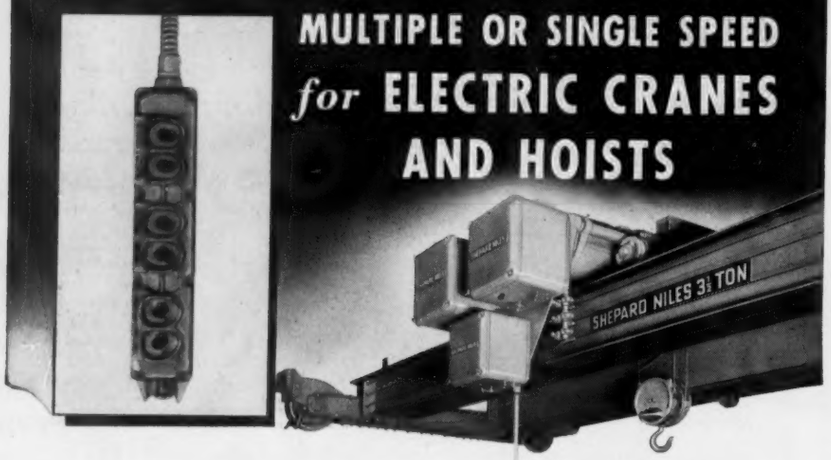
Tin Plate

Tin Plate Prices, Page 82

Tin plate operations are steady at 70 per cent. Specifications still are

Push button control

MULTIPLE OR SINGLE SPEED *for* ELECTRIC CRANES AND HOISTS



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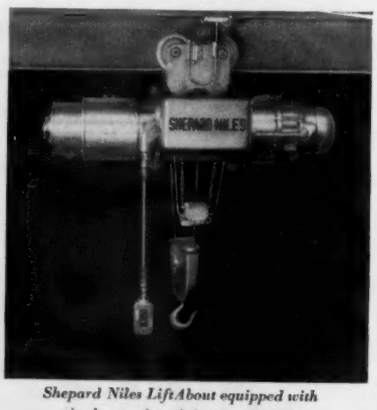

Shepard Niles LiftAbout equipped with single speed push button control.

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being stepped up and are expected to reach a peak before the end of June. Packers' demands are heavier than general line cans, although the latter remain fairly active. Beer container specifications are brisk.

Rails, Cars

Track Material Prices, Page 83

Inquiry by the Western Maryland for a maximum of 1110 freight cars on which bids will be opened June 22 is the only bright spot in the market. The inquiry calls for 100 to 500 each of box and hopper cars, 100 gondolas and 10 flat cars. A Costa Rica railroad has placed 50 box cars with Magor Car Corp., Passaic, N. J.

Steel buying by carriers is confined to repair materials, which are being specified well. Rail backlogs have been worked down until the end of the program is seen, with no further tonnage in sight.

Car Orders Placed

Ferrocarril al Pacifico, Cotsa Rica, 50 box cars, to Magor Car Corp., Passaic, N. J.

Car Orders Pending

Western Maryland, maximum of 1110 freight cars, 50-ton capacity; 100 to 500 each box and hoppers, 100 drop-end gondolas and 10 flat cars; bids June 22.

Buses Booked

American Car & Foundry Motors Co., New York: Ten motor coaches, for Houston Electric Co., Houston, Tex.; fifth repeat order to total of 40 coaches.

Wire

Wire Prices, Page 83

Cleveland — Wire business is steady, having shown only slight variation for several weeks. May bookings compared favorably with April's with activity in merchant products somewhat better than expected. A slower market is looked for this month. Automotive requirements continue relatively light.

Chicago—Merchant wire demand is in fair volume but is expected to moderate this month. Distributors and building interests have furnished a large share of total business. Automotive buying of manufacturers' wire has been only of a fill-in nature lately.

Boston—Wire business is well diversified, but volume holds at the recent low rate. Manufacturers' wire is in steadiest demand. Most orders call for prompt delivery, with mill backlogs small or absent entirely. Wire prices are generally steady.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 83

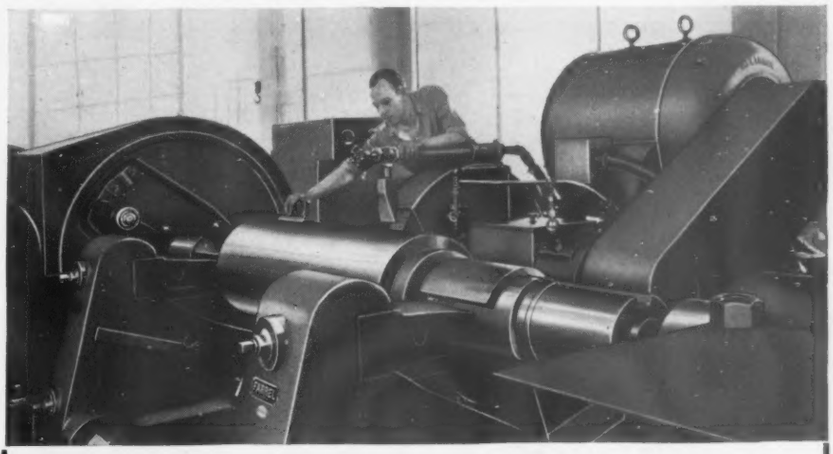
Bolt and nut prices generally are being reaffirmed for third quarter. However, one producer has announced for June only a 5 per cent reduction in quotations to the wholesale hardware, jobbing and mill supply trade. This deduction is in recognition of certain irregularities in prices named to these distributors.

Shapes

Structural Shape Prices, Page 82

Pittsburgh — Private work is coming out in better volume than at any time the past two years. About half of new inquiries is private construction, with total volume large. Largest of the new inquiries involves 2200 tons for a library building, Richmond, Va., for the state.

Cleveland — Largest award went to Mt. Vernon Bridge Co., Mt. Vernon, O., for the Erie avenue bridge



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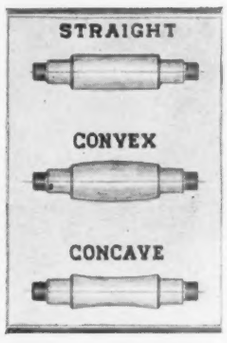

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superstructure, Lorain, O. Bids are due June 15 on 1500 tons for the upper West Third street bridge, over the Cuyahoga river, here. A number of state bridge jobs bid May 26 are to be readvertised. Prices remain weak.

Chicago — Inquiries are lighter than a month ago, but recent awards and inquiries involving more than 100 tons each show an upturn in number. Illinois state highway department received bids last week on 8 bridges involving 900 tons.

Boston — Although awards continue light, miscellaneous inquiry is up slightly. Vermont still has bridge needs aggregating 300 tons up for estimates, which together with scattered other spans in New England, approximate 550 tons. District fabricating shops are operating with small backlogs.

Buffalo — Principal interest is focused on several substantial pending jobs. Topping the list is 4000 tons for the new convention hall here on which foundation work is being completed. An award is expected soon on the Commodore Perry housing project involving more than 1200 tons of reinforcing bars and joists and 375 tons of structurals.

New York — Inquiry is slightly heavier, notably for engineering projects, viaducts and bridges, a former in New York city taking close to 5000 tons. Bridges in New Jersey require about 1200 tons. Contracts are also improved moderately, but with few large tonnages involved. Fabricated prices continue low.

April fabricated structural steel bookings were the largest this year, according to reports to American Institute of Steel Construction, amounting to 116,801 tons against 95,065 in March and 91,158 tons in April, 1938. April shipments fell below March, totaling 114,212 tons compared with 125,259 in March and 100,038 tons in April last year. In four months this year bookings were 44.4 per cent of the average total bookings for the first four months of the years 1923-1925.

Philadelphia — Armstrong Cork Co., Lancaster, Pa., takes bids June 5 on a warehouse requiring about 1000 tons. Several smaller jobs are before the trade but total volume is disappointing. Pittsburgh-Des Moines Steel Co., Pittsburgh, was awarded 1560 tons for Portsmouth, N. H., navy yard, welded construction.

Seattle — Isaacson Iron Works, Seattle, is low and will probably be awarded 1508 tons for the Ballard bridge, Seattle.

San Francisco — While awards were the largest in over six weeks, inquiries remain exceptionally quiet. Largest inquiry calls for 1700 tons of bearing piles for the United States Engineer office, Los Angeles, bids in. Awards aggregated 4598 tons, bringing the total to date to 59,920 tons compared with 46,554 tons in 1938.

St. Louis — The American Bridge Co. booked 11,000 tons for a bridge over the Mississippi river, Greenville, Miss., and 9000 tons went to Bethlehem Steel Co. for a span, Natchez, Miss. Otherwise only small lettings were made, totaling under 350 tons.

Shape Awards Compared

	Tons
Week ended June 3	48,113
Week ended May 27	14,923
Week ended May 20	11,337
This week, 1938	10,657
Weekly average, year, 1938	21,566
Weekly average, 1939	24,463
Weekly average, April	24,531
Total to date, 1938	337,562
Total to date, 1939	513,720

Includes awards of 100 tons or more.

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Shape Contracts Placed

10,800 tons, bridge, Greenville, Miss., PWA docket 1273F, to American Bridge Co., Pittsburgh.

8800 tons, bridge over Mississippi river, Natchez, Miss., for city, to Bethlehem Steel Co., Bethlehem, Pa.

6000 tons, viaduct, Belt parkway project, Brooklyn-Queens, N. Y., to American Bridge Co., Pittsburgh; through P. T. Cox Construction Co., New York.

2500 tons, Sacramento river and Doney creek bridge, Central Valley project, Calif., to Bethlehem Steel Co., San Francisco.

2500 tons, superstructure, Erie avenue bridge, Lorain, O., to Mt. Vernon Bridge Co., Mt. Vernon, O.

2500 tons, nurses' home, Medical Center, Jersey City, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

2000 tons, addition to Tulane university stadium, New Orleans, to G. C. Doulout & Ewin Co., New Orleans.

1560 tons, ship fitters' shop, Portsmouth navy yard, to Pittsburgh-Des Moines Steel Co., Pittsburgh, welded construction.

1120 tons, addition, Erasmus Hall high school, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.; through Tobias & Heller, New York, general contractors.

725 tons, grade crossing elimination, Staten Island railroad, Huguenot, Staten Island, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

629 tons, Dayton avenue bridge, United States engineer office, Los Angeles, to Stupp Bros. Bridge & Iron Works, St. Louis.

560 tons, Madison Square Boys' club, 312 East Thirtieth street, New York, to Harris Structural Steel Co., New York; A. L. Hartridge Co., New York, general contractor.

560 tons, power house, Central Illinois Public Service Corp., Hutsonville, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

555 tons, bridge 1806, Caddo parish, Louisiana, to Jones & Laughlin Steel Corp., Pittsburgh.

500 tons, bridge, Mission street, Pittsburgh, for city, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, Chelsea Village development, Atlantic City, N. J., to Keystone Structural Steel Co., Trenton, N. J.; through Anthony Miller, Trenton.

490 tons, Harlem Boys' club, West 134th street, New York, to Harris Structural Steel Co., New York; A. L. Hartridge Co., New York, general contractor.

480 tons, galvanized towers and extensions, civil aero authority, Washington, to American Bridge Co., Pittsburgh.

475 tons, high school, Middletown, N. Y., to American Bridge Co., Pittsburgh.

435 tons, factory building, B. La Rosa Co., Danielson, Conn., to Lehigh Structural Steel Co., Allentown, Pa.; Leo F. Caproni, New Haven, construction engineer.

427 tons, Judson street viaduct, St. Paul, to Oaks Construction Co.

300 tons, school, Eden, N. Y., to Ernst Iron Works Inc., Buffalo.

250 tons, ten oil derricks, for Long Beach Oil Development Co., Long Beach, Calif to unnamed interest.

250 tons, highway bridge over Fox river, Eureka, Wis., to Wisconsin Bridge & Iron Co., Milwaukee.

240 tons, residence hall for women, University of Maine, Orono, Me., to Lyons Iron Works, Manchester, N. H.

235 tons, addition, U. S. Gypsum Co., New Brighton, Staten Island, N. Y., to Fort Pitt Bridge Works, Pittsburgh; Turner Construction Co., New York, general contractor.

229 tons, five bridges, Arapahoe county, Colorado, to unnamed interest.

225 tons, industrial building, Bristol, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; through Frank V. Warren Inc., Bristol, general contractor.

220 tons, Mills bridge, Tillamook county, Oregon, to unnamed interest.

205 tons, bridge FAGM-487-B, Ellis county, Texas, to Virginia Bridge Co., Roanoke, Va.

205 tons, bridge FAGM 236, Portage, Wis., to Milwaukee Bridge Co., Milwaukee.

180 tons, Archer-Daniels, Midland building, Decatur, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

175 tons, factory building, Kilian Mfg. Co., Syracuse, N. Y., to Syracuse Engineering Co., Syracuse, N. Y.

175 tons, Laurel Hill tunnel, Somerset, Pa., Pennsylvania turnpike commission, to Republic Steel Corp., Cleveland.

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165 tons, beam bridges, Gettysburg and LaPlant, S. Dak., for U. S. department of interior, to Bethlehem Steel Co., Bethlehem, Pa.

153 tons, under-crossing, Sixth avenue, Seattle, to unnamed interest.

150 tons, state bridge 53.80, Casselton, N. Dak., to Minneapolis-Moline Power Implement Co., Minneapolis.

150 tons, residence, E. I. du Pont de Nemours & Co., Wilmington, Del., to Bethlehem Fabricators Inc., Bethlehem, Pa.; through Turner Construction Co., Philadelphia.

150 tons, power plant addition, Worthington, Minn., for city, to Minneapolis-Moline Power Implement Co., Minneapolis.

130 tons, building, McCrory Stores Corp., Cumberland, Md., to Levinson Steel Co., Pittsburgh.

105 tons, transfer table, Chicago, Milwaukee, St. Paul & Pacific railroad, to Wilson Bridge & Iron Co., Milwaukee.

105 tons, transmission towers, Buchanan dam, Lower Colorado river authority, to Muskogee Iron Works, Muskogee, Okla.

Unstated tonnage, cell block addition and locking equipment, McNeil federal prison, Washington state, to unstated interest.

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9110

Shape Contracts Pending

3210 tons, William Howard Taft high school, Bronx, N. Y.; Wilake Construction Co., New York, low.

2200 tons, library building, Richmond, Va., for state.

1455 tons, Lewis river bridge, Clark and Cowlitz county, Washington; call for bids canceled.

1047 tons, state bridges, Oswego, Hamilton and Allegheny counties, New York; bids June 21.

1000 tons, warehouse, Wamkill Realty Co., Bronx, N. Y.

1000 tons, warehouse, Armstrong Cork Co., Lancaster, Pa.; bids June 5.

900 tons, highway bridges, state of Illinois; bids in.

900 tons, new driveaway building, Ford Motor Co., Dearborn, Mich.

800 tons, state bridge over Elk river, Cecil county, Maryland.

725 tons, five bridges, Chincoteague, Va., for state.

500 tons, machine shop, Ohio Steel Foundry Co., Lima, O.

500 tons, buildings, for International Harvester Co., Harrisburg, Pa.

400 tons, public school No. 18, Buffalo; bids June 13.

400 tons, store building additions, for B. Foreman Co., Rochester, N. Y.

350 tons, civic auditorium, Great Falls, Mont.; G. C. Boesflug, Miles City, Mont., low on general contract, at $488,380.

350 tons, bridge approach, Rankin, Pa., for Allegheny county, Pennsylvania.

300 tons, freight car handling crane, Seatrain Lines Inc., Texas City, Tex.

300 tons, state highway bridge, East Alton, Ill.

300 tons, state highway bridge, Galt, Ill.

300 tons, gymnasium building, Nazareth academy, Rochester, N. Y.

300 tons, piling, Cuyahoga river straightening project, Cont. 16, cut 3B; L. A. Wells Construction Co., Cleveland, low.

300 tons, approaches to Twenty-third street viaduct over Union Pacific tracks, Denver; bids in.

250 tons, engineering building, Bucknell university, Lewisburg, Pa.

250 tons, state highway bridge, PWA 1020-3-F, Weathersfield, Vt.

240 tons, addition to store, Denton's Inc., Springfield, O.

236 tons, beam bridge, Anneta, Tex.; bids in.

225 tons, power house, Keystone Steel & Wire Co., Peoria, Ill.

200 tons, shore parkway, Kings and Queens counties, New York, for city of New York.

200 tons, one 200-ton traveling gantry crane, water and power department, Los Angels; bids opened.

200 tons, highway bridge near Milwaukee; bids June 6.

180 tons, state highway bridge, Toledo, O.

175 tons, building, Wright field, Dayton, O.; bids June 7.

170 tons, warehouse and garage, Western Electric Co., Atlanta, Ga.

165 tons, building, American Cyanamid Chemical Corp., Kalamazoo, Mich.

147 tons, bridge, Thompson, Conn.; bids June 12.

135 tons, extension to bridge 110.36, Pennsylvania railroad, Rochville, Pa.

125 tons, state bridge 379.32, FAGH-264-B, Fassenden, N. Dak.

125 tons, bridge 212 and 74, Missouri Pacific railroad, Independence, Kans., and Crane, Mo.

120 tons, extension to sheet metal annealing building, Otis Steel Co., Cleveland.

120 tons, police barracks and garages, Canaan and Danielson, Conn., for state.

120 tons, machine and storage buildings, Scott Paper Co., Chester, Pa.

120 tons, state highway bridge, Princeton, Ill.

120 tons, state highway bridge, Chillicothe, Ill.

115 tons, power plant facilities, Kings Park, N. Y., for state.

115 tons, barn building, for W. C. Gates, Tyrone, Pa.

100 tons, one 50-ton overhead traveling crane, specification 843, Grand Coulee dam, Wash.; Bedford Foundry & Machine Co., Bedford, Ind., low at $12,700.

Unstated tonnage, lift span bridge, Hood river, Oregon, for Washington Bridge Co., Olympia, Wash.; Gilpin Construction Co., Portland, Oreg., general contractor.

Unstated tonnage, shapes for Coulee pwer plant, Washington state; bids in at Denver, June 2.

Unstated tonnage, gantry and traveling cranes for Roza diversion dam and Coulee power plant; Schmitt Steel Co., Portland, and Bedford Foundry & Machine Co., Bedford, Ind., low.

Unstated tonnage, Ohio Injector Co., Wadsworth, O.

Reinforcing

Reinforcing Bar Prices, Page 83

Pittsburgh — The price situation is unchanged, although there is possibility that a firmer market in eastern states will develop shortly. New inquiries are fairly active with prospects that awards will be maintained throughout the next 60 days at least. Most of the new work is on public jobs, with the various sections of the Pennsylvania turnpike between Pittsburgh and Harrisburg holding the spotlight.

Chicago — Volume of pending small jobs has decreased, but numerous larger projects are still hanging fire. Award is expected soon on 500 tons for a department of agriculture laboratory, Peoria, Ill. Two bridges for the board of local improvements, Chicago, involve 600 tons.

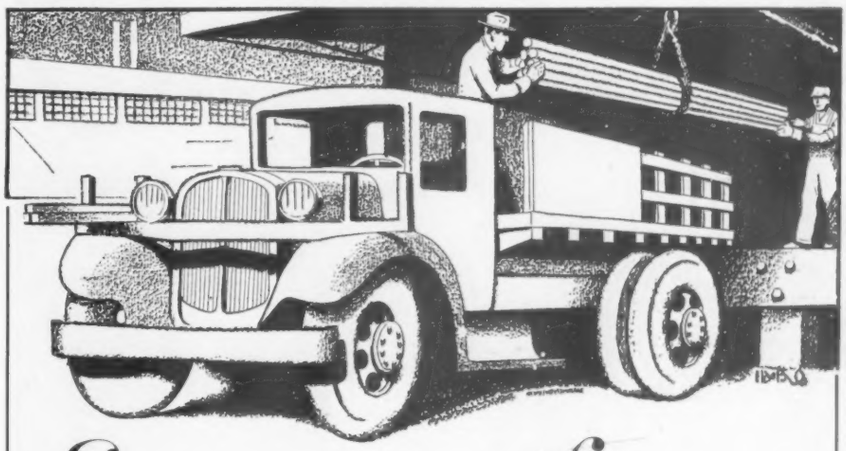
New York — Buying is heavier, led by 1600 tons for an east side drive section here. Inquiries are coming out in better volume, with Connecticut closing June 12 on close to 400 tons for bridges and highways. Prices continue weak with larger tonnages bringing out substantial concessions.

Cleveland — Bids went in late last week on the Luna park housing project, involving 750 tons. A number of school jobs here have kept local fabricators fairly busy and additional work from this source is expected soon. Private work is light although some gains have been noted recently. No improvement in the price situation has developed.

Philadelphia — Turner Construction Co., Philadelphia, has been awarded the contract for Delaware hospital, Wilmington, Del., and will take bids June 15 on the bars required, about 500 tons. Prices continue decidedly weak despite reported efforts to stiffen the market.

Seattle — Bethlehem Steel Co., Seattle, booked 1600 tons involved in the federal court house, Seattle, N. P. Severin Co., Chicago, general contractor. About 1000 tons are pending in various projects in this area, including several small industrial plant jobs.

San Francisco — Awards totaled 1507 tons, bringing the aggregate for the year to 77,026 tons, compared with 41,534 tons for the same period last year. Gilmore Fabricators Inc. took 219 tons for an industrial build-



Emergency Service—

COLD drawn steel requirements cannot always be anticipated. Occasionally there are *rush* orders. Warehouse stocks of regular cold drawn steels in standard sizes and shapes are carried in all important manufacturing centers. Emergency service—rush order service—is at your elbow—The Telephone.

•

Moltrup Steel Products Co.
Beaver Falls, Pa.
(Pittsburgh District)
New York • Chicago • Philadelphia • Cleveland • Boston • Houston • Detroit
Erie • San Francisco • Atlanta • Norfolk • Seattle • Pittsburgh • Buffalo • Dayton

ing on Alcatraz Island and unnamed interests were awarded 200 tons for a mausoleum at Inglewood, Calif.. Barracks, mess hall and galley buildings for the naval air base, Alameda, Calif., up for bids on June 14, will require 1505 tons.

Reinforcing Steel Awards

1600 tons, East side drive, Fifty-fourth to Sixty-fourth street, New York, to Truscon Steel Co., Youngstown, O.; through Poirier & McLane Corp., New York.

1600 tons, Seattle federal courthouse, to Bethlehem Steel Co., Seattle; N. P. Severin, Chicago, general contractor.

700 tons, housing project, Newark, to Bethlehem Steel Co., Bethlehem, Pa.; through Fatzler Co., Newark.

700 tons, administration group buildings, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; Chas. H. Tompkins, contractor.

500 tons, Great Lakes Carbon Corp. plant, Niagara Falls, N. Y., and 375 tons for Commodore housing project, Buffalo, listed under Reinforcing placed in May 29 issue as awarded to Bethlehem Steel Co. were erroneously reported.

375 tons, Kleinhans music hall, Buffalo, to Bethlehem Steel Co., Buffalo.

300 tons, Triborough hospital, Queens, N. Y., to Wickwire-Spencer Steel Co., New York; through Eureka Mfg. Co., New York.

275 tons, buildings, New Syndicate Co., Brooklyn, N. Y., to Truscon Steel Co., Youngstown, O.

219 tons, industrial building, Alcatraz Island, San Francisco, to Gilmore Fabricators Inc., San Francisco.

200 tons, housing development, blocks F and G, Syracuse, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; W. J. Burns Co., Syracuse, contractor.

200 tons, mausoleum, Inglewood, Calif., to unnamed interest.

191 tons, highway work, Grant, Linn and Jefferson county, Oregon, to unnamed interests.

175 tons, bridge, route 77, Grundy county, Illinois, to Bethlehem Steel Co., Bethlehem, Pa.

160 tons, bridge, Mazonia, Ill., to Calumet Steel Co., Chicago.

150 tons, addition to Bullock's, West Los Angeles, to unnamed interest

125 tons, Cross Island parkway project, Queens, N. Y., to Igoe Bros. Co., New York; through J. Leopold & Co., New York.

125 tons, highway project and bridge, Warren couty, New Jersey, to Igoe Bros. Co., Newark, N. J.; through Korp & Korp, Camden, N. J.

100 tons, Batelle Memorial institute, Columbus, O., to West Virginia Rail Co., Huntington, W. Va.; E. Elford & Son, contractor.

100 tons, walnut packing plant, Calistoga, Calif., to unnamed interest.

100 tons, five bridges, Arapahoe count, Colorado, to unnamed interest.

Reinforcing Steel Pending

1505 tons, barracks, mess hall and galley buildings, specification 8617, naval air base, Alameda, Calif.; bids again postponed to June 14.

1280 tons, highway projects, Hamilton, Orange and Suffolk counties, New York; bids June 21.

850 tons, Great Salt Plains reservoir, Little Rock, Ark.

720 tons, viaduct, Brooklyn, N. Y.; P. T. Cox Construction Co., New York, general contractor.

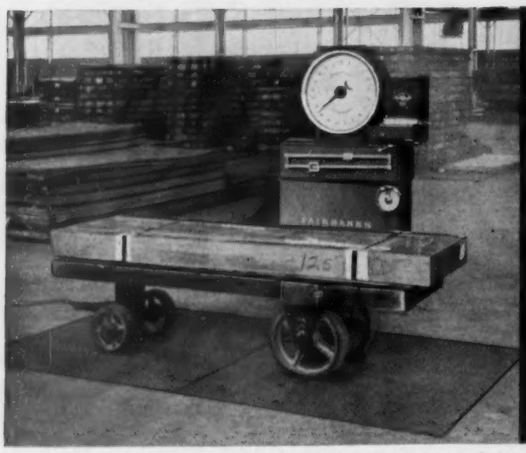
700 tons, viaduct, Shore parkway, MS-39-9, Brooklyn, N. Y.

693 tons, Western Regional laboratory, Albany, Calif.; bids opened.

600 tons, laboratory building, U. S. department of agriculture, New Orleans; H. A. Rife Construction Co., Dallas, Tex., low.

500 tons, Delaware hospital, Wilmington,

A Matter of Record!



Fairbanks Platform Dial Scales with Printomatics PROTECT PROFITS IN STEEL

Fairbanks platform dial scale with Printomatic used for weighing and printing weights in a steel plant.

In mills, factories, warehouses—wherever avoidable weighing inaccuracies and needless wasted time reduce legitimate margins—it's a matter of record that Fairbanks platform dial scales with Printomatics protect profits in steel. For incoming or outgoing shipments—or for production lines or interdepartment checking—the scale is loaded . . . a button is touched . . . and actual weight figures are *a matter of record.*

Inadequate light, poor eyesight, guesswork need no longer take their toll of profits, for the Printomatic never makes mistakes. Accurate weights are printed on tickets or roll tape in single, duplicate, or triplicate form. Hurried weighmen no longer squint and hope their eyes are not deceiving . . . for the moment the pointer comes to unwavering rest, the Printomatic is ready to tell the truth *in print.*

The traditional accuracy of Fairbanks scales is your assurance that small margins will not fall prey to human errors. Find out how Fairbanks scales can make added savings and increased profits a matter of record in your plant.

Write Fairbanks, Morse & Co., Dept. 96, 600 South Michigan Avenue, Chicago, Illinois. Branches and service stations throughout the United States and Canada.

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FAIRBANKS MORSE Scales

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Concrete Bars Compared

	Tons
Week ended June 3	7,395
Week ended May 27	*10,485
Week ended May 20	10,940
This week, 1938	1,705
Weekly average, year, 1938	6,959
Weekly average, 1939	10,934
Weekly average, April	9.494
Total to date, 1938	125,321
Total to date, 1939	*229,629

*Revised

Includes awards of 100 tons or more.

Del.; Turner Construction Co., Philadelphia, general contractor; steel bids June 15.

450 tons, laboratory building, U. S. department of agriculture, Chicago, O'Neill Construction Co., Chicago, low.

445 tons, Lewis river bridge, Clark and Cowlitz county, Washington; call for bids canceled.

400 tons, highway and bridge projects, Connecticut; bids June 12.

400 tons, river intake, Owensboro, Ky.; Foundation Co., New York, low.

390 tons, sewage plant, Marion, Ind.

383 tons, sections 2B and 3A1, Arona borough and Hempfield township, Westmoreland county, Pennsylvania turnpike commission.

367 tons, four bridges in Los Angeles county, California, for state; bids June 15.

350 tons, extension of steam distribution system, Washington.

350 tons, housing project, Elizabeth, N. J.; Millimet Construction Co., New York, general contractor.

346 tons, under-pass, Phoenix, Ariz.; general contract to Lee Moor Contracting Co., El Paso, Texas, at $178,891.

265 tons, including 60 tons mesh, 15 piers and two abutments, approaches, Passaic river bridge, route 35, section 30-B, Kearny-Newark, N. J.; bids June 16; E. Donald Sterner, state highway commissioner, Trenton.

264 tons, section 5A, Donegal borough, Donegal and Mt. Pleasant townships, Westmoreland county, Pennsylvania, turnpike.

230 tons, contracts SC-39-21, circumferential highway, New York; bids June 5.

210 tons, highway, West Greenwich-Exeter, R. I.; bids June 5, Providence, R. I.

200 tons, Students' Union building, University of Illinois, Urbana, Ill.; English Bros., Champaign, Ill.

200 tons, paving, Shore and southern Construction Co., New York, general parkways, Queens, N. Y.; Garafano contractor.

200 tons, highway project D, Epping, N. H.; Lane Construction Co., Meriden, Conn., general contractor.

200 tons, state library, Richmond Va.

200 tons, bridge over Elk river, Elkton, Md.

200 tons, Shore and Southern parkway, MSO-39-5, Brooklyn, N. Y.

190 tons, bridge, Chincoteague island, Virginia.

175 tons, sections 5 and 6, Donegal and Cook townships, Westmoreland county, Pennsylvania, turnpike.

150 tons, sanatorium, Shonghum, N. J.

150 tons, public school No. 18, Buffalo; bids June 13.

150 tons, highway project and bridge, Haverhill, Mass.

135 tons, Plum Beach channel bridge, New York; bids June 5.

130 tons, building, The Best Foods Inc., San Francisco; bids opened.

Unstated tonnage, Montana state bridge projects, St. Regis river and Glacier county, San Orino, Portland, Oreg., and Staunton Co., Great Falls, Mont., general contractors.

Ferroalloys

Ferroalloy Prices, Page 84

New York—Books for third quarter business in ferromanganese and spiegeleisen are not expected to be opened much before the middle of June, but no revisions in prices are looked for. Ferromanganese shipments have tapered so far this month and the May total is thought likely to fall below April. Spiegeleisen movement is steady.

Steel in Europe

Foreign Steel Prices, Page 85

London—(*By Radio*)—Markets of Great Britain have been quiet during the Whitsuntide period but steel and ironworks continued practically full operation. Normal commercial demand is expanding and foundry pig iron shipments are improving. Two stacks have been relighted by Colvilles Ltd. and United Steel Co. Quota of semifinished Continental steel imports has been increased 300,000 tons for the May to October period.

The Continent reports quiet Whitsuntide trade. Underlying market conditions are good. Home and export production is increasing and prices are firm.

Perkins Man Coolers create refreshing recirculation of air without chilling drafts.

Perkins Man Coolers help to maintain production schedules in the hottest places.

Perkins Man Coolers decrease labor turnover and help to make contented workers.

PERKINS MAN COOLERS ARE MADE IN OSCILLATING AND STATIONARY TYPES, BOTH PORTABLE.

B. F. PERKINS & SON, INC. HOLYOKE, MASS.

Engineers and Manufacturers

PERKINS MAN COOLERS

TRADE MARK REG. U. S. PAT. OFF.

Behind the Scenes with STEEL

Wintersteen for President

■ We meant to tell you before about the 63rd annual bull fight, ox roast and Wintersteen birthday party held over in Lebanon, Pa., week before last. Railroad men and suppliers from all over the country gathered for this old-fashioned outdoor picnic in honor of John Wintersteen, president of the Cornwall & Lebanon railroad, the 13-mile road (now owned by Bethlehem) which carries ore from the historic Cornwall banks. We are told ore from these famous banks went into cannon used during the Civil war. With live bulls for playmates, we understand, P. J. Cristy, eastern sales manager, Chicago Pneumatic Tool Co., had quite a time as master of ceremonies.

Copy Chasers Note

■ Never, say the experts, should one use superlatives in one's advertising. The Smithville (Ohio) Inn Inc. thinks differently. Their timid copy reads: *The largest, most famous and best chicken dinner house in America!* And it is.

Utopia Defined

■ At the opening of the World Automotive Engineering Congress in New York a couple of weeks ago Alfred Reeves, general manager, Automobile Manufacturers' association, whimsically referred to the remoteness of Utopia. Utopia, he said, will never come until the Ku Klux Klan meets the Knights of Columbus at baseball on a Zion City diamond on a Sunday, with Father Divine as umpire and with the proceeds to go to the Jewish refugees abroad.

Dentist Goes Awelding

■ From the Welding Engineering Co. up Milwaukee-way comes a copy of a letter they recently received from a dentist out in Kansas. "Your quotation interests me. I fear you will be discouraged or displeased with my seeming vacillation and hesitancy, but I believe I should first get the sanction of the power company. Up to the present my knowledge of welding is limited, though I have read the few treatises I can get hold of. But these simply spur me and intensify my cognizance of the meagerness of my knowledge of the principles and fundamentals of processes by which electricity accomplishes its purposes. Now, with the above, please tell me more details of your A. C. welder." Roll over, Mr. Webster, you have sold another dictionary.

Elephantiasis

■ G. J. Hawkey, Cleveland Duplex Machinery Co., gives us another mild ribbing on our elephant friend who graces the Materials Handling page each week. Says he: *His eyes look like mine felt last night after a strenuous session of the A. S. T. E. at the German club. Furthermore, how did this elephant get the bad case of "housemaid's knee" on his right front leg?* So far as we can tell, Mr. Hawkey, the ol' boy apparently used to do a specialty act with Ringling Brothers before we got him. The climax of the show was when he spun around 37 times on that right front knee, with the mahout on top spinning the opposite way while the band played the Toreador from Carmen.

'Way Back When

■ STEEL, it would seem, has a lasting quality much like a rare perfume. Last week from Pittsburgh came an urgent request for a copy of the May 25, 1911 issue, which incidentally we don't recall very clearly since we were only three days into this strange and baffling world and did not yet know where to get authoritative information on the steel and metalworking industry.

SHRDLU

—The Market Week—

Pig Iron

Pig Iron Prices, Page 84

Pittsburgh—Shipments have increased slightly. Foundry operations are better in some directions, but gains are irregular. Some iron still is being shipped at prices prevailing before the $1 increase last year.

Cleveland—Pig iron sellers are accepting business for third quarter delivery at current prices but have made no formal announcement to this effect. Interest in forward contracting is scant, some consumers still having iron due against old commitments.

Chicago—May shipments were about 3 to 5 per cent below April, in line with early expectations. One interest, however, reported a substantial increase because of special shipments.

Boston—The Everett, Mass., furnace goes in blast this week. Pig iron buying has improved slightly, but with little gain in foundry melt.

Cincinnati—Northern iron prices have been reaffirmed for third quarter and southern iron quotations also are expected to be continued.

Philadelphia—May pig iron shipments were about 30 per cent ahead of April. Consumption is holding well. It is generally assumed prices will be continued into third quarter without formal announcements.

Buffalo—May pig iron shipments were slightly ahead of April, with foundries ordering tonnage for only immediate needs. Lighting of an additional blast furnace by Bethlehem Steel Co. gives the district seven active stacks out of 14.

Warehouse

Warehouse Prices, Page 85

Philadelphia — Warehouses are continuing sheet prices at recent levels, explaining that the previous spread over mill figures was unjustifiably narrow. May business was about 10 per cent ahead of April, 20 per cent better than a year ago.

Cleveland — Sales have shown little effect from recent price reductions, May business approximating that of April. June outlook is indefinite, but only small variations in demand are expected.

St. Louis — Sales tapered the end of May, wiping out gains scored over April earlier in the month. Outlook for June and July is somewhat unfavorable. Demand from rural areas is slow.

Boston — Improvement in warehouse volume which developed encouragingly last month has carried

over into June. While orders are generally small, purchases are more numerous and well diversified. New prices on most standard items are well maintained.

Scrap

Scrap Prices, Page 86

Pittsburgh—Mill buying is quiet, but shipments reflect improvement in steelmaking. Prices are unchanged, with buyers offering figures within the quoted range. Expected closing down within the next 30 days of a plant recently producing synthetic scrap, coupled with the improved ingot rate, give a better outlook to summer months.

Detroit—Scrap activity is at a low ebb. Small lists of automotive scrap up for bids last week brought unchanged prices. Cast grades are in best demand but also are relatively quiet.

Philadelphia—Better demand for some lower-price scrap grades is attributed to relatively high prices that have developed on the usual heavy melting grades as a result of export business.

Boston—More grades of scrap are moving into current export shipments, notably stove plate and No. 2 cast, the former bringing $10.50, dock, and No. 2 cast around $12.

New York—Domestic scrap buying lags but movement against old export orders continues brisk. Prices generally are unchanged and untested.

Cleveland — With new railroad offerings of iron and steel scrap of small proportions, some ear-marked for export, the scrap market has strengthened materially, although continuing inactivity of the past few weeks.

Chicago — No. 1 heavy melting steel generally is bringing dealers $13.25, although last significant mill purchases were at $13. Rumors of a $13.50 sale are without confirmation.

Iron Ore

Iron Ore Prices, Page 86

Cleveland — May shipments of Lake Superior iron ore totaled 3,601,453 tons, an increase of 2,420,750 tons or 205 per cent over the 1,180,703 tons shipped a year ago, according to the Lake Superior Iron Ore association. Shipments to June 1 aggregated 3,658,251 tons, an increase of 154 per cent over the 1,441,217 tons shipped in the same period in 1938.

Nonferrous Metals

Nonferrous Metal Prices, Page 100

New York — No definite trend was discernible in London metal markets last week with both sales and prices fluctuating in line with favorable and unfavorable developments.

Copper — While electrolytic held unchanged here at 10.00c, Connecticut, the export market advanced to around 10.17½c, c.i.f. European ports which forced refiners to raise their bids for copper and brass scrap ⅛-cent. The sales volume here, while under 20,000 tons, was the third heaviest for any month so far this year.

Lead — Active demand here and rising prices abroad strengthened the undertone of the domestic market. Actual consumption has shown gradual improvement recently. All first hands again quoted on the basis of 4.60c, East St. Louis.

Zinc — Consumer buying interest tapered, reflecting in part the further decline in galvanized sheet output rate to 54 per cent. Prime western held at 4.50c, East St. Louis.

Protect Your Workers with
MORTON'S SALT TABLETS

Heat-Fag and hot weather travel together. You can't stop the weather — but, you *can protect your workers against Heat-Fag* and stop the sag in the production line by placing Morton's Salt Tablets at every drinking fountain. These handy little tablets represent the easiest and most convenient way to replace the vitally needed body salt that's sweated out by hard work on hot days.

MORTON'S SALT TABLETS
Dissolve in 50 Seconds

Workers find them easy to take with a drink of water. They dissolve quickly. Only the purest and most highly refined salt is used.

MORTON'S DISPENSER . . . Sanitary, Economical, Convenient

Install Morton's dispensers and salt tablets in your plant now. Get ready for the hot days ahead. Remember—a small investment now will protect the health and efficiency of your workers when Heat-Fag threatens your plant. Shipments will be made promptly — prepaid.

Write for folder—"Heat-Fag"

MORTON SALT COMPANY CHICAGO, ILLINOIS

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MOORE RAPID
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for
MELTING
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Alloy and Carbon Steels.
Gray and Malleable Irons.
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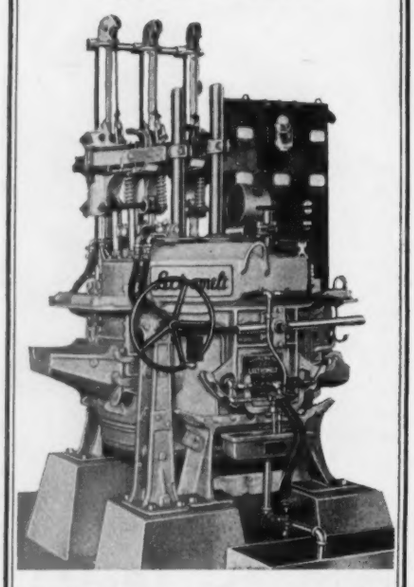

Illustration shows a 500 pound capacity 3 phase direct arc LECTROMELT furnace installed in jobbing steel foundry.

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ECONOMICAL
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BUILT IN STANDARD SIZES
25 LBS. TO 50 TONS CAPACITY

PITTSBURGH
LECTROMELT
FURNACE
CORP.
PITTSBURGH, PA.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound.

May	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
27	10.00	10.00	9.62½	49.00	48.62½	4.75	4.60	4.50	20.00	12.00	35.00
29	10.00	10.00	9.62½	49.00	48.75	4.75	4.60	4.50	20.00	12.00	35.00
30—Holiday											
31	10.00	10.00	9.62½	49.00	48.75	4.75	4.60	4.50	20.00	12.00	35.00
June											
1	10.00	10.00	9.62½	49.00	48.62½	4.75	4.60	4.50	20.00	12.00	35.00
2	10.00	10.00	9.62½	49.00	48.62½	4.75	4.60	4.50	20.00	12.00	35.00

MILL PRODUCTS
F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 10.00c Conn. copper

Sheets
Yellow brass (high) 16.48
Copper, hot rolled 18.12
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes
High yellow brass 19.23
Seamless copper 18.62

Rods
High yellow brass 11.85
Copper, hot rolled 14.62

Anodes
Copper, untrimmed 15.37

Wire
Yellow brass (high) 16 73

OLD METALS
Nom. Del. Buying Prices

No. 1 Composition Red Brass
New York 5.87½-6.12½
Cleveland 6.50-6.75
Chicago 6.00-6.25
St. Louis 6.00-6.25

Heavy Copper and Wire
New York, No. 1 ..... 7.87½-8.00
Cleveland, No. 1 ..... 7.50-7.75
Chicago, No. 1 ..... 7.37½-7.62½
St. Louis 7.50-7.75

Composition Brass Borings
New York 5.12½-5.37½

Light Copper
New York 6.37½-6.62½
Cleveland 5.75-6.00
Chicago 6.00-6.25
St. Louis 6.00-6.25

Light Brass
Cleveland 3.50-3.75
Chicago 3.87½-4.12½
St. Louis 3.50-3.75

Lead
New York 4.00-4.25
Cleveland 3.50-3.75
Chicago 3.50-3.75
St. Louis 3.50-3.75

Zinc
New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.00-2.25

Aluminum
Borings, Cleveland 5.75-6.00
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 13.75-14.00
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS
Brass ingot, 85-5-5-5, less carloads .10.25
standard No. 12 aluminum ... 12.00-12.25

Construction and Enterprise

New York

HUDSON FALLS, N. Y.—Union Bag & Paper Corp. has plans underway for erecting and equipping a two-story, 100 x 100-foot addition to its plant.

NEW YORK—General Tire Co. of New York has plans in progress for altering its four-story warehouse and shipping plant at cost of $100,000. Francisco & Jacobus, New York, architects.

NIAGARA FALLS, N. Y.—Great Lakes Carbon Corp., Chicago, has awarded contract to Walter S. Johnson Building Co., Niagara Falls, for a carbon electrode plant estimated to cost more than $40,000.

Connecticut

NEW BRITAIN, CONN.—City, G. J. Coyle, mayor, is making a survey in connection with proposed construction of a municipal power plant costing more than $40,000. L. T. Klander, Philadelphia, consulting engineer.

New Jersey

ENGLEWOOD, N. J.—Watson Elevator Co., New York, has awarded contract to Bonamno Construction Co., North Bergen, N. Y., for a two-story, 100 x 250-foot addition to its elevator factory.

Pennsylvania

BLOSSBURG, PA.—J. P. Ward Foundry Co. has awarded a contract for rebuilding its foundry at estimated cost of $100,000 to G. Case, Troy, Pa. (Noted May 22.)

JERSEY SHORE, PA.—Standard Cable Corp., C. H. Mencer, representative, is awarding contracts for altering a former silk mill for manufacture of wire and other copper products. Cost estimated at more than $75,000 with equipment.

Ohio

DELPHOS, O.—Village, David Baringer, mayor, is considering proposal for an electric system. Citizens' committee, Carl Smith, representative in charge.

McGUFFEY, O.—Village, Lacy Kissling, clerk, will hold a special election on proposal to issue $14,000 bonds to finance waterworks system. Edison Ellis, Van Wert, O., consulting engineer.

STEUBENVILLE, O.—City, Eugene Boyd, service director, has completed plans and will probably take bids during week of June 12 on contracts 8, 9 and 10 for sewers and pumping station Consulting engineers, H. P. Jones & Co., Toledo, O. (Noted May 1.)

TROY, O.—Village, William Viebahn, assistant service director, takes bids due at noon, June 14, on additions to its generating equipment and overhead and underground distribution systems. Consulting engineers, Froehlich & Emery, Toledo, O.

Michigan

ANN ARBOR, MICH.—King Seeley Corp. proposes to construct a five-story, 60 x 120-foot addition to its plant at cost of more than $160,000.

PONTIAC, MICH.—American Forging & Socket Co. plans to construct at cost of $100,000 a 120 x 340-foot, one-story addition to its plant for producing au-

tomobile hardware. Will install machinery and power equipment. C. J. Heenan, Pontiac, architect.

Illinois

WINCHESTER, ILL. — Illinois Rural Electric Co., H. G. Bryan, project superintendent, has been allotted a $100,000 REA loan for additional rural electric power transmission lines in eight counties. A. Y. Taylor & Co., Clayton, Mo., consulting engineers.

Alabama

DOUBLE SPRINGS, ALA.—City asks bids until June 8 on water distributing system, including valves, hydrants, etc., and costing $23,000. J. W. Goodwin Engineering Co., Birmingham, Ala., consulting engineer.

DOUBLE SPRINGS, ALA.—Court of county commissioners receives bids June 8 on contract 3 for a waterworks system. Involves distributing system, elevated storage tank and iron removal tank; estimated cost, $23,000. J. W. Goodwin Engineering Co., Birmingham, Ala., consulting engineer.

District of Columbia

WASHINGTON—Navy department, bureau of yards and docks, plans to build a power house costing $50,000 at the naval destroyer base in San Diego.

Florida

GRACEVILLE, FLA.—West Florida cooperative, Claude Smith, superintendent, has $194,000 REA allotment and will construct 105 miles of rural electric power transmission lines in four counties.

Mississippi

LUCEDALE, MISS. — Singing River Electric Power association, Ben Deshaze, president, has been allotted $213,000 by REA, plans to erect 290 miles rural power lines in three counties.

MERIDIAN, MISS.—City votes June 6 on proposal to issue $200,000 bonds to finance improvements to its waterworks, including new reservoir.

North Carolina

SHALLOTTE, N. C.—Brunswick Mutual Electric Corp. has received an REA allotment of $171,000 for 211 miles of rural electric power lines in two counties.

Tennessee

CARTHAGE, TENN.—Upper Cumberland Electric Membership Corp. has been allotted $485,000 by REA for 381 miles of rural transmission lines in four counties.

DECATUR, TENN. — Maigs County Electric Membership Corp. has been allotted a $487,000 REA loan to finance 324 miles of rural electric power transmission lines in six counties.

MURFREESBORO, TENN.—Middle Tennessee Electric Membership Corp. has received $680,000 allocation from REA for building 525 miles of rural electric lines in four counties.

SHELBYVILLE, TENN.—Duck River Electric Membership Corp. has a $1,161,000 REA allotment for 590 miles of rural power lines serving 4488 consumers in six counties.

Louisiana

GOOSPORT, LA.—Wackman Welded Wire Co., St. Louis, has plans for a plant for manufacturing fabricated steel products. Cost estimated at $100,000.

Virginia

BLACKSTONE, VA.—Southside Electric co-operative, C. S. Hooper Jr., superintendent, will build approximately 401 miles of rural power lines in ten counties at cost of more than $1,000,000.

Missouri

SPRINGFIELD, MO.—City receives bids June 6 for constructing a filter at northwest sewage disposal plant. Funds available include $180,135 PWA allotment and $220,000 city bonds.

Oklahoma

SAYRE, OKLA.—Northfork Electric Co-operative Inc., E. M. Wade, president, is receiving bids for 156 miles of rural electric lines in Beckham county and 275 miles in Rogers Mills county. Total cost estimated at $145,000.

Texas

HOUSTON, TEX.—Hake Tool Co. is erecting a one-story factory building which will be leased after completion

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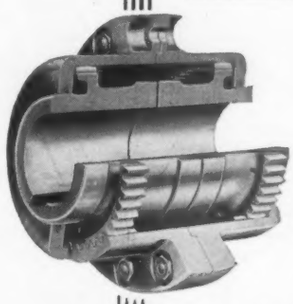

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SAN AUGUSTINE, TEX.—Deep East Texas Electric co-operative soon takes bids on 181 miles of rural power lines in seven counties at cost of $157,000. W. G. Morrison, Waco, Tex., engineer.

Kansas

BELLEVILLE, KANS.—REA has allotted $313,000 to the N.C.K.R.E. association, Guy Ward, representative, to finance 355 miles rural electric lines in two counties. Paulette & Wilson, Salina, Kans., consultants.

EL DORADO, KANS.—Butler Rural Electric co-operative, A. H. Gish, president, has been allotted $132,000 by REA for 138 miles of rural power lines serving 312 consumers in two counties.

PLEVNA, KANS. — Arkansas Valley Electric co-operative, George Griffin, president, has received $251,000 from REA to finance some 300 miles of rural transmission lines in three counties.

SENECA, KANS.—REA has allotted $350,000 to Marshall-Nemeha Rural Electric service, A. J. Wempe, president, to finance 375 miles rural electric power transmitting lines in two counties. Paulette & Wilson, Salina, Kans., consultants.

North Dakota

KINDRED, N. DAK.—Cass County Electric co-operative, E. J. Morton, secretary, has been allotted an additional $183,000 by REA to finance 212 miles of rural power transmission lines in four counties. M. S. Hyland, Fargo, N. Dak., consulting engineer.

Iowa

EDGEWOOD, IOWA—City, L. L. Shaffer, clerk, is considering construction of a municipal power and light plant to cost more than $15,000 with equipment.

NEW HAMPTON, IOWA—City, Alva Griffith, clerk, is studying proposal to construct a municipal power plant costing $200,000. Project involves 750-kilowatt diesel engine with appurtenances, cooling tower, fuel oil tanks, switchboard panel. Ralph D. Thomas & Associates, Minneapolis, consulting engineers.

PRESTON, IOWA—City has voted to build a municipal power and light plant at cost not to exceed $45,000. (Noted May 15.)

SIBLEY, IOWA — REA has allotted $181,000 loan to Osceola Electric co-operative, Henry Consoer, president, to finance rural transmission lines in the county totaling 197 miles.

WATERLOO, IOWA—City, Ralph Slippy, mayor, has completed plans and will soon accept bids for two sewage disposal plants estimated to cost together about $750,000. C. T. Wilson, city engineer.

Idaho

ASHTON, IDAHO—Fall River Rural Electric co-operative takes bids to 10 a.m., June 8, on 73 miles of rural power lines. Walter Flora, Cheyenne, Wyo., consulting engineer. Certified check 5 per cent to accompany bid.

Pacific Coast

BERKELEY, CALIF.—A. Lietz Mfg Co., maker of engineering, drafting and marine instruments, plans to start construction immediately of a new plant. First unit to comprise 10,000 square feet. A. Leitz Jr., president, San Francisco.

LOS ANGELES — Clarkiron Co., E. Reynolds, president, is drawing preliminary plans for a projected iron ore extraction plant costing $750,000. W. Gordon Clark, Los Angeles, engineer.

PASADENA, CALIF.—City proposes to install at cost of about $25,000 a new blower to operate aeration tanks at its sewage disposal plant. H. W. Hincks, city engineer.

SAN BERNARDINO, CALIF.—Arrowhead Springs Hotel Co. will take bids this month on a sewage disposal plant, with Imhoff tank, trickling filter, secondary tank and sand filter, costing $25,000. Currie Engineering Co., San Bernardino, engineer.

PORTLAND, OREG.—Tri-State Construction Co. has been awarded contract to erect at cost of $53,247 several shop buildings at Boise, Idaho, for United States forestry service.

Canada

SUMMERLAND, B. C. — Municipality takes bids until Aug. 1 on a waterworks system costing $145,000. D. Dickinson, Summerland, consultant.

OTTAWA, ONT.—Department of public works has drawn up plans and voted $100,000 for a power house, pump house and machine shop at Lorne drydock.

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READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Pendulum Swings Back

To the Editor:

As a fairly close and much interested observer of trends in labor matters I am pleased at the evident reversed swing of the pendulum to a more normal position in the attitude of laws and government. For some years past radical labor ideas have been in the ascendency, to the great detriment of employers and of a large portion of workers. Free rein has been given for organizations to coerce workers by every means to join organizations which, in their administration, have been practically rackets, living off the dues collected from members recruited by force. Picketing to collect dues is proof of this statement.

Within the past few months the return to sanity has been apparent. Several states have passed laws making many of the former practices illegal. The sit-down strike has been outlawed in spite of its former support by government officials, at least by their inaction.

A movement is on the way to revise the Wagner act to allow employers equal rights with labor organizations. This will give workers some semblance of freedom in choosing agents for collective bargaining.

The change in sentiment is an inevitable result of the high-handed procedure of the past few years, during which time certain organizations have ridden roughshod over constitutional rights. The tendency to correct these conditions seems to be gaining force.

Labor as a whole will be the gainer from the change in sentiment. Workers will be freed from the illegal domination of organizers actuated by lust of political power and desire for funds arising from union dues. Better relations between employer and employe will result.

The change in sentiment augurs a better appreciation by the public of the labor situation, an understanding of the results of coercion and the rights of the worker to be employed without permission of an outside agency.

CHARLES H. DAVIS

Philadelphia

Steel Always Modern

To the Editor:

Modernization of plant by the steel industry is reflected in the report of the American Iron and Steel institute (STEEL, June 5, p. 80), giving statistics of plants abandoned or dismantled since 1926 and new plants built to keep pace with demand.

Much comment has been made in recent months as to lack of ability of many branches of the metalworking industry to keep plant equipment up to the level of efficiency. A high percentage of machinery is said to be outmoded and inefficient in comparison with modern devices.

In the production of steel this is not so, as the institute report shows. Every effort has been made to incorporate the most efficient processes, and obsolete plants have been replaced by rolling mills and other equipment to give the best possible product. This has been necessary, to provide products suited to modern manufacturing methods.

An interesting sidelight is found in the statement that the more efficient mills require more workers than their predecessors. The explanation of this probably is the higher quality of products, requiring more processing.

Steel executives have shown much foresight in adopting advanced methods, not hesitating to abandon old equipment when newer plants offer better steel at lower cost, providing material for manufacturing better products.

FABRICATOR

New York

Old Hands Have Value

To the Editor:

Good understanding between workers and employers must exist in a great many institutions in Cleveland when 700 workers have been employed 40 years or more in the same place (STEEL, June 5, p. 21). No better evidence is needed. And the one worker with 61 years for the same employer really sets some kind of a record. In an adjoining column is recounted presentation of a plaque to a Revere Copper & Brass employe of 50 years.

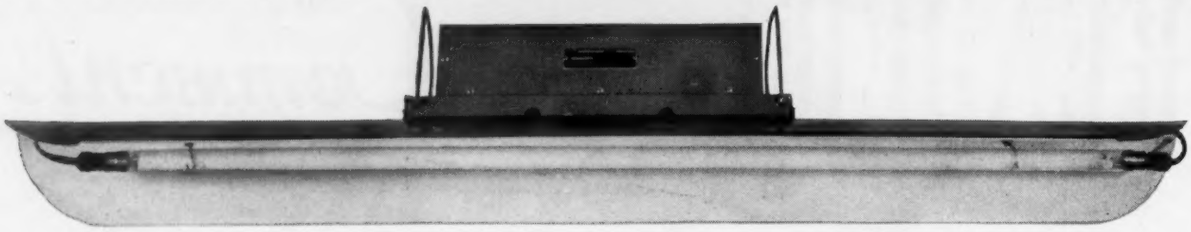
These must be good employers and these workmen must have been efficient to continue the mutual relation so many years. Another thought comes up in this connection, that men are not being discharged at 40 or 50 years on account of age. Instead they seem to be held for their experience and they are valued in proportion to their service.

These records have been made through the past decade when unemployment has been heavy and employers could have replaced these employes by younger men, perhaps at lower wages. Facts like these coming to public notice indicate a high level of employe relationship and doubtless could be duplicated in every city in the land. These men are the backbone of any working force and industry is the stronger for their presence.

WILLIAM JOHNSON

Cleveland

TO MEET INDUSTRY'S DEMANDS FOR ECONOMICAL HIGH ILLUMINATION LEVELS...THE NEW COOPER HEWITT



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